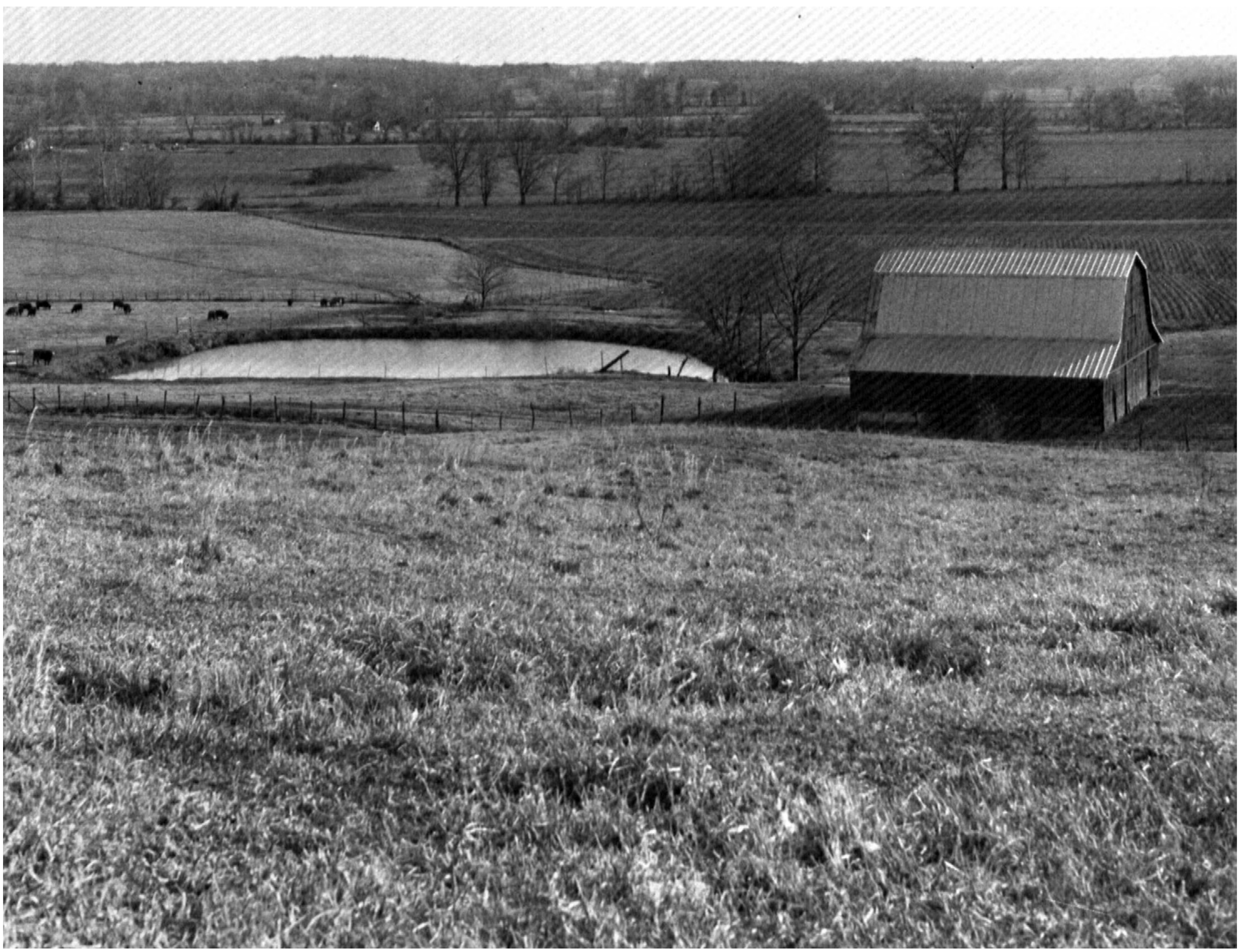
United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
Tennessee Agricultural
Experiment Station,
Lauderdale County Board
of Commissioners,
Tennessee Valley
Authority, and Tennessee
Department of Agriculture

Soil Survey of Lauderdale County, Tennessee



How To Use This Soil Survey

General Soil Map

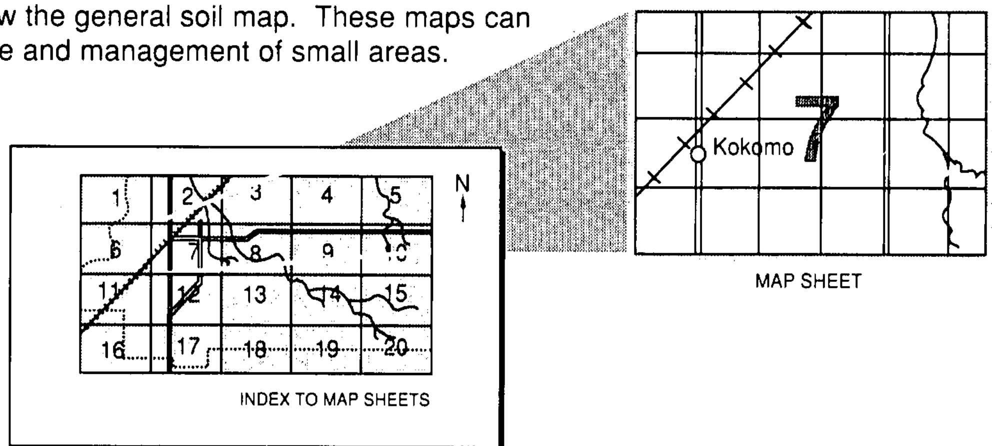
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

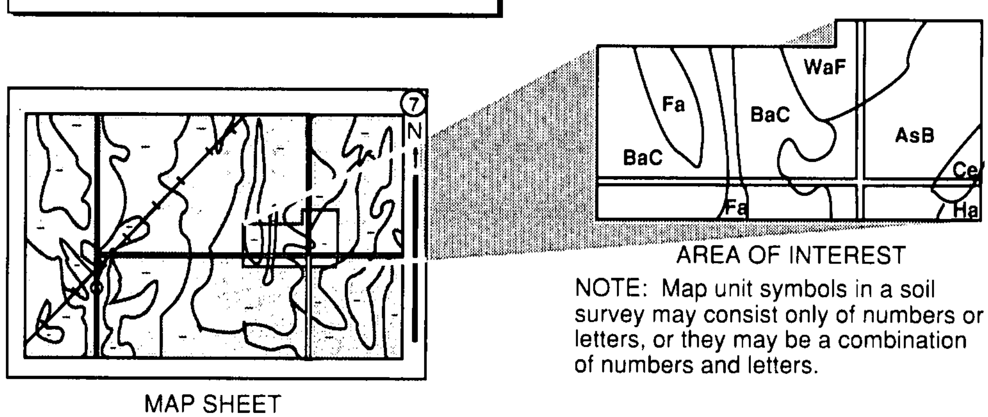
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1983. Soil names and descriptions were approved in 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1983. This soil survey was made cooperatively by the Soil Conservation Service and the Tennessee Agricultural Experiment Station, Lauderdale County Board of Commissioners, Tennessee Valley Authority, and Tennessee Department of Agriculture. It is part of the technical assistance furnished to the Lauderdale County Soil Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Over two-thirds of the land in Lauderdale County is used as farmland. Memphis soil in the foreground is used as pasture, and the less sloping Grenada, Calloway, and Center soils in the background are mostly used as cropland.

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Issued June 1990

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Foreword

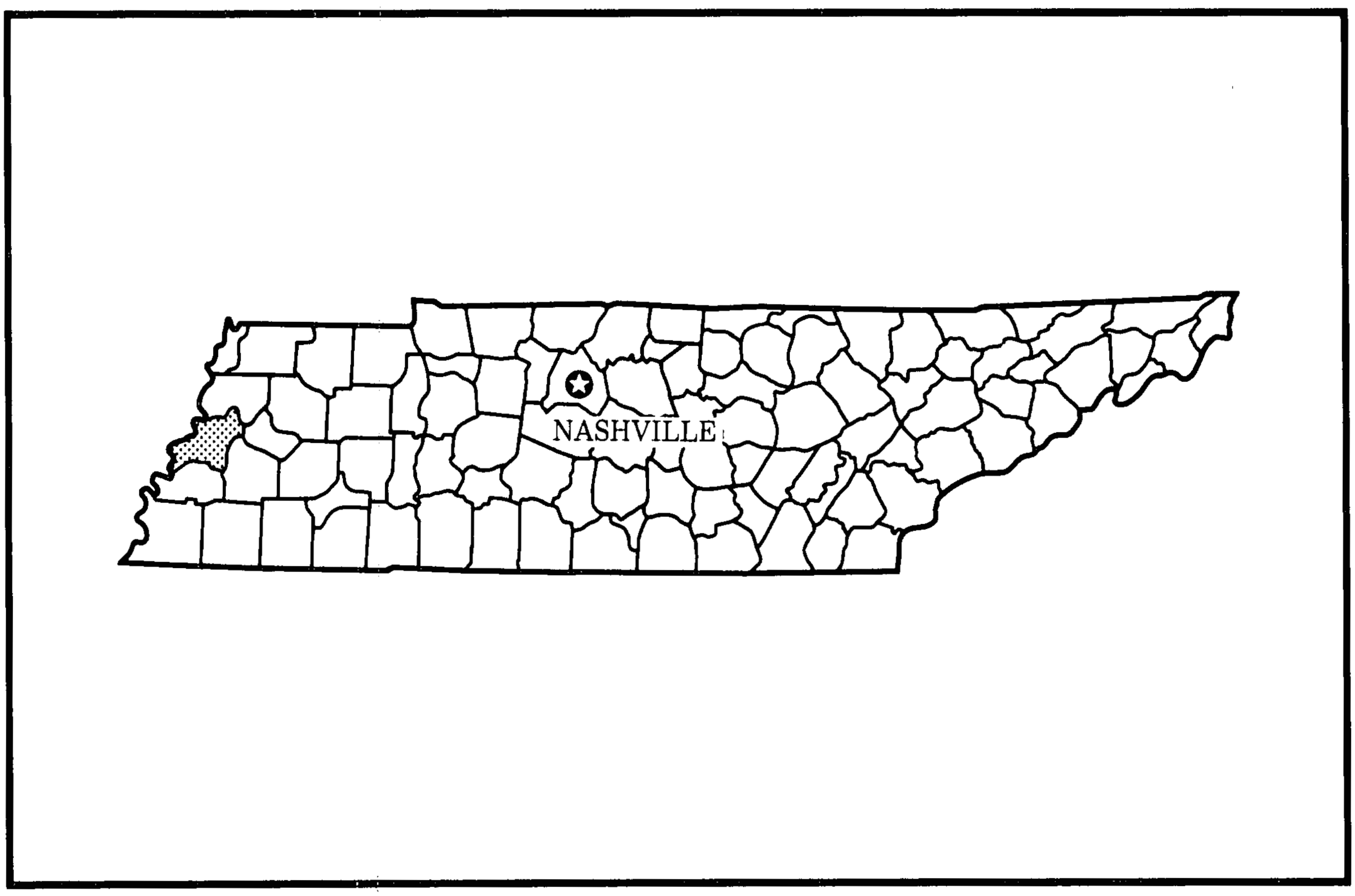
This soil survey contains information that can be used in land-planning programs in Lauderdale County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Jerry S. Lee
State Conservationist
Soil Conservation Service



Location of Lauderdale County in Tennessee.

Soil Survey of
Lauderdale County, Tennessee

By Steven E. Monteith, Soil Conservation Service

Fieldwork by Steven E. Monteith and Debra K. Brasfield, Soil Conservation Service;
Steven B. Feldman and Robert L. Seals, Tennessee Valley Authority;
and Gary M. Chandler, A. Gary Lemmons, and John M. Richardson, Lauderdale County Board of Commissioners and Tennessee Department of Agriculture

United States Department of Agriculture, Soil Conservation Service,
in cooperation with
Tennessee Agricultural Experiment Station, Tennessee Valley Authority, Tennessee Department of Agriculture, and Lauderdale County Board of Commissioners

General Nature of the County

LAUDERDALE COUNTY is in west Tennessee bordering the Mississippi River. It has a land area of 305,300 acres, or 477 square miles. Ripley, the county seat, is about 50 miles north of Memphis and about 60 miles south of the Kentucky State line. According to the 1980 census, the population of Lauderdale County, was 24,555. Agriculture and related service companies are the most economically important industries in the county. Several small to medium manufacturing companies are in the cities of Ripley, Halls, and Henning.

According to the 1978 Census of Agriculture, about 67 percent of the county was in farmland. The average farm was about 283 acres. About 20 percent of the county was in woodland. The remaining 13 percent was in urban and built-up areas, including residential areas, roads, and other miscellaneous land uses.

Most of the farmland is used for row crops, and some of the steepest land is used as pasture for beef cattle. Soybeans is the main crop; and wheat, cotton, grain sorghum, and corn are also grown. Tomatoes and other vegetable crops are increasing in importance. In recent years, considerable pasture and woodland acreage has been converted to cropland and is used to grow soybeans.

The eastern two-thirds of Lauderdale County consists of nearly level to steep, well drained to poorly drained, silty soils on loess uplands. The western one-third of the county consists of nearly level, well drained to poorly drained, clayey to sandy soils on the Mississippi River flood plain. These soils formed in alluvial material. The flood plains of the Hatchie and Forked Deer Rivers drain the eastern two-thirds of the county. The soils on these flood plains are silty and are well drained to very poorly drained.

History and Development

In 1778, Henry Rutherford began surveying the western district of North Carolina, now west Tennessee, at Key Corner. Soon after, a significant number of settlers moved into Key Corner in what is now Lauderdale County. This area was settled mostly in the early 1800's. In 1835, Lauderdale County was formed from parts of Tipton, Haywood, and Dyer Counties, and the town of Ripley was established as the county seat.

At first, the settlers inhabited and cleared the less steep, loess uplands because these fertile lands were the easiest to farm. They then cleared the steeper areas; and most of these areas were used as pasture until recently. Many steep areas on the loess uplands have been left in woodland.

The Forked Deer River flood plain was cleared, and it was farmed to some extent after the river was channeled. The wetter, more prone to flooding bottom lands of the Forked Deer and Hatchie Rivers have been left in woodland. Most of the bottom land of the Mississippi River was used for production of bottomland hardwood timber. This land was not cleared and farmed until after World War II.

When larger equipment became available, drainage and land clearing operations became more economical, and when soybeans, which are tolerant to wet conditions and late planting, became an economically profitable crop, large acreages of Mississippi River bottom lands were cleared in a short time for growing crops. Several large tracts of Mississippi River bottom lands, which are privately owned by the timber companies, are the only significant areas that are used for timber production. The Mississippi River levee system was built by the U.S. Army Corps of Engineers, but it was never extended into Lauderdale County; therefore, most of the land on the Mississippi River flood plain is occasionally flooded.

Economy and Industry

Lauderdale County's economy almost totally depended on agriculture in the first half of this century. Agriculture and related service companies are still the most economically important industries in the county; however, other companies have grown rapidly in recent years and now are also very important to the county's economy. In Ripley, Halls, and Henning, a diversity of manufacturing companies employ a significant part of the county's population. Manufacturing companies include clothing, wood products, plastics, automotive products, and electrical and metal working. Industrial parks in Ripley and Halls provide space for developing new enterprises. Some county residents work outside the county in nearby towns and cities, including Dyersburg and Memphis.

Transportation

Lauderdale County has a very good system of county, state, and federal highways. U.S. Highway 51, a major north-south transportation route in west Tennessee, runs through the center of the county. Tennessee State Highways 19, 87, and 88 run east-west across the county to the Mississippi River. Most county roads are paved.

The Illinois Central Railroad runs north-south through the county and provides rail service to Henning, Ripley, Gates, and Halls. Two grain elevators at Golddust and Hales Point provide ports on the Mississippi River for loading grain onto barges. A community airport near Halls provides service for small private aircraft.

Physiography, Relief, and Drainage

The highest elevation in Lauderdale County is 520 feet above sea level and is on several ridgetops between Edith and Dry Hill. The lowest elevation is 220 feet above sea level on Sunrise Towhead and Hatchie Towhead.

The western one-third of the county is on the Mississippi River flood plain. The soils are nearly level to slightly undulating. Elevation on the flood plain ranges from 220 to 260 feet. The highest areas on the flood plain are on natural levees, which are deposits of loamy material along the banks of present or old channels of the Mississippi River. During periods of major flooding, these natural levee areas are only occasionally flooded. The lowest areas on the flood plain are in slack-water areas, which are broad, flat, or depressional areas some distance away from the present river channel. These areas are frequently flooded and remain flooded for long periods. The sediment in these areas is dominantly clayey. In these areas, various ditches, sloughs, and bayous drain directly or indirectly into the Mississippi River. Water levels in these channels fluctuate with the level of the Mississippi River. Water backs up into these drainage channels as the river rises and floods the lower-lying areas, and it flows out of these drainage channels as the river falls.

The eastern two-thirds of the county consists of loess uplands and the flood plains of the streams that drain them. The elevations of the loess uplands generally are higher near the bluff and are lower towards the east. The loess is underlain by gravelly and sandy Coastal Plain sediment at a depth of 10 to 70 feet. The loess uplands drain northeast into the Forked Deer River or southwest into the Hatchie River except for Cold Creek and Knob Creek that drain west onto the Mississippi River flood plain.

The loess uplands are highly dissected near the bluff by very steep side slopes and long, narrow, gently sloping ridgetops. Generally, the loess uplands become less steep and dissected toward the east. Old loess covered terraces near Cane Creek and the Forked Deer River are broad and undulating to nearly level. The flood plains of the Hatchie and Forked Deer Rivers are wide, and the soils are nearly level to depressional.

Climate

Prepared by the National Climatic Data Center, Asheville, North Carolina.

Lauderdale County has long, hot summers with uncomfortably high relative humidity. Summer is the driest season. Extended dry periods normally occur, but prolonged droughts are rare. In the summer, the rain falls mainly during short, intense thunderstorms. Winter is cool and wet with occasional periods of cold weather. In winter, some snowfall generally occurs, but accumulation is seldom significant. Most precipitation in winter falls as rain. Spring is mild, wet, and windy. Autumn is warm and relatively dry.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Ripley, Tennessee, in the period 1962 to 1980. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 38 degrees F, and the average daily minimum temperature is 28 degrees. The lowest temperature on record, which occurred at Ripley on January 25, 1963, is -6 degrees. In summer the average temperature is 78 degrees. The highest recorded temperature, which occurred on July 12, 1980, is 105 degrees.

Growing degree days are shown in table 1. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 51 inches. Of this, 26 inches, or 50 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 21 inches. The heaviest 1-day rainfall during the period of record was 5.56 inches at Ripley on April 4, 1968. Thunderstorms occur on about 53 days each year, and most occur in summer.

The average seasonal snowfall is 9 inches. The greatest snow depth at any one time during the period of record was 13 inches. On an average of 4 days, at least 1 inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 80 percent. The sun shines 75 percent of the time possible in summer and 55 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 11 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of parent material. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining

their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

1. Commerce-Robinsonville

Somewhat poorly drained and well drained, silty or loamy soils, formed in recent alluvium

This map unit is on broad natural levees that generally run parallel to channels of the Mississippi River (fig. 1). These soils generally are elongated and are in the highest positions on the flood plain. The slopes generally are long and flat. Depressions and remnants of old stream channels are common, unless the land has been leveled. The slopes range from 0 to 5 percent.

This map unit makes up about 16 percent of the county. It is about 40 percent Commerce soils, 30 percent Robinsonville soils, and 30 percent soils of minor extent.

Commerce soils are on the back slopes of natural levees and are farther from the river channels than Robinsonville soils. The surface layer of Commerce soils is very dark grayish brown silt loam. The subsoil is dark grayish brown silt loam and silty clay loam.

Robinsonville soils are in the highest positions on the landscape adjacent to river channels. These soils have a surface layer of brown fine sandy loam. The underlying material is stratified brown, yellowish brown, dark yellowish brown, and dark grayish brown very fine sandy loam, loamy fine sand, and silt loam.

The minor soils are Crevasse and Bruno soils on sandy ridges next to the river and Openlake and Keyespoint soils in the lower depressional areas.

About 85 percent of the acreage in this map unit has been cleared and is used for row crops. Soybeans is the major crop. Smaller acreages are planted to cotton and corn. Wheat and soybeans are double cropped on some of the acreage. Most of the uncleared acreage is in mixed hardwoods in the Anderson-Tully Wildlife Management Area.

These soils are well suited to row crops. Optimum yields of most commonly grown crops can be expected with proper management. Natural fertility is high and little additional fertilizer or lime is needed. Tilth generally is good. Flooding and wetness are the main limitations affecting crop production.

The soils in this map unit are well suited to pasture and hay production.

These soils are well suited to the production of trees. Sugarberry, boxelder, pecan, elm, and eastern cottonwood are the dominant trees in the wooded areas. Wetness and flooding are moderate concerns in woodland management and restrict the use of logging equipment in some wet periods.

These soils are not suited to building site development because of the flooding hazard, and they also are not suited as sites for septic tank absorption fields.

2. Sharkey-Keyespoint-Openlake

Poorly drained and somewhat poorly drained soils that are clayey or are clayey in the upper part and loamy in the lower part, formed in recent alluvium

This map unit is in slack-water areas or on old natural levees of the Mississippi River (see fig. 1). The levees are no longer near the river and are now slack-water areas during periods of flooding. The delineations

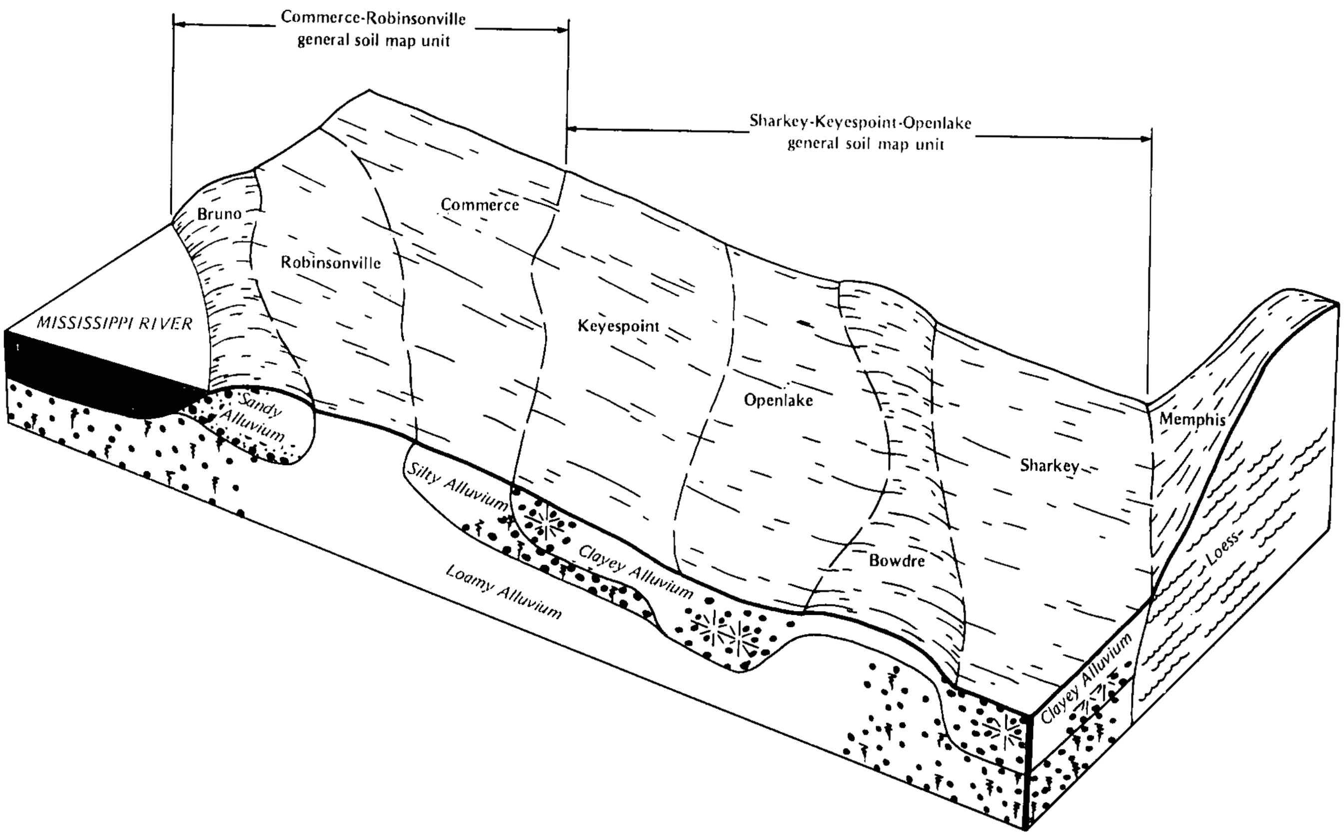


Figure 1.—Typical pattern of soils and underlying material in the Commerce-Robinsonville and Sharkey-Keyespoint-Openlake general soil map units on the Mississippi River flood plain.

vary in shape and generally are in medium to low positions on the flood plain. The slopes are long and smooth. Some depressional areas hold water for long periods. The slopes range from 0 to 3 percent.

This map unit makes up about 18 percent of the county. It is about 35 percent Sharkey soils, 25 percent Keyespoint soils, 15 percent Openlake soils, and 25 percent soils of minor extent.

Sharkey soils are in low, flat slack-water areas. These soils have a surface layer of very dark grayish brown clay. The subsoil is dark gray and gray clay. Mottles are in shades of red and brown.

Keyespoint soils are on the back slopes of old natural levees. These levees are no longer near river channels and are now slack-water areas during periods of flooding. These soils have a surface layer of very dark grayish brown silty clay. The subsoil is dark grayish brown silty clay and clay. Mottles are in shades of brown and gray. Depth to the loamy substratum is 24 to 40 inches.

Openlake soils are in low, flat to slightly undulating, slack-water areas. These soils have a surface layer of very dark grayish brown silty clay. The subsoil is dark grayish brown clay and silty clay. Mottles are in shades of brown and red.

The minor soils are Commerce and Robinsonville soils in higher positions and Tunica and Bowdre soils in slack-water areas.

About 60 percent of the acreage in this map unit has been cleared and is used for row crops. Soybeans is the main row crop. Smaller acreages are planted to cotton, corn, and grain sorghum. Wheat and soybeans are double cropped in a few higher positions. The uncleared acreage is large blocks of mixed nardwoods. Most of this acreage is owned by a large lumber company.

These soils are moderately suited to crops that can be planted late in the growing season and are tolerant to wetness. Some soils in the lower, very wet areas are not suited to crops. Moderate yields of adapted crops, such as soybeans, can be expected if flooding is not a problem. Natural fertility is high and little additional lime

or fertilizer is needed. Tilth generally is poor because of the clayey surface texture. Flooding and wetness are the main limitations affecting crop production.

These soils are poorly suited to pasture and hay because of wetness and flooding. Summer annual pasture grasses and bermudagrass are suitable pasture plants.

These soils are well suited to the production of trees. Elm, sugarberry, sweetgum, eastern cottonwood, and baldcypress are the dominant trees in the wooded areas. Wetland oaks and hickories are dominant in areas where the soil reaction is more acid. Wetness and flooding are the main limitations affecting use of equipment in management and harvesting of timber. Some of the soils in the poorly drained areas are probably better suited to timber production than to crop production.

These soils are not suited to building site development because of the flooding hazard and the high shrink-swell potential of the clayey layers. They are not suited as sites for septic tank absorption fields because of flooding and slow percolation; and are poorly suited as sites for roads and streets because of flooding, high shrink-swell potential, and low strength.

3. Dundee-Amagon-Askew

Poorly drained to moderately well drained soils, formed in old loamy alluvium overlain by a layer of silty or clayey recent alluvium

This map unit is in broad, flat to slightly undulating areas of the Mississippi River flood plain near the Forked Deer River. The slopes generally are long and flat. Depressional areas are common, and water stands in some of these areas for long periods. A few areas are higher, and the slopes are slightly convex. The slopes range from 0 to 2 percent.

This map unit makes up about 3 percent of the county. It is about 35 percent Dundee soils, 20 percent Amagon soils, 20 percent Askew soils, and 25 percent soils of minor extent.

Dundee soils are in intermediate positions between Askew and Amagon soils. The surface layer of Dundee soils is very dark grayish brown silty clay. The overwash material below the surface layer is dark grayish brown silty clay. The subsoil is grayish brown and light brownish gray silt loam and loam. Mottles are in shades of brown. The substratum is grayish brown loam that has mottles in shades of brown.

Amagon soils are in low, flat to depressional areas. These soils have a surface layer of dark brown silty clay loam. The overwash material below the surface layer is light brownish gray silty clay loam, and a buried surface layer and subsoil are gray silt loam and silty clay loam that has mottles in shades of brown. The substratum is grayish brown loam that has gray mottles.

Askew soils are in high positions on the landscape and are nearly level to slightly undulating. These soils have a surface layer of dark brown silty clay loam. The overwash material below the surface layer is dark brown silty clay loam that has grayish brown mottles. The subsoil is dark yellowish brown and yellowish brown silt loam and loam. Mottles are in shades of gray and brown. The substratum is yellowish brown fine sandy loam that has mottles in shades of gray and brown.

The minor soils are the Sharkey soils in low depressions and old channels and the Dubbs soils in higher positions.

About 80 percent of the acreage in this map unit has been cleared and is used for row crops. Soybeans is the main crop. The uncleared acreage is scattered blocks of mixed hardwoods.

These soils are moderately suited to row crops, such as soybeans, that are tolerant to wetness and do not require early planting. Moderate yields can be expected if flooding is not a problem. Natural fertility is medium. The soil reaction ranges from strongly acid to neutral. Lime and fertilizer are needed for optimum yields. Tilth is generally poor because of the heavy textured surface layer. Flooding and wetness are the main limitations affecting crop production.

These soils are poorly suited to pasture and hay production because of wetness and flooding. Summer annual pasture grasses and bermudagrass are suitable pasture plants.

These soils are well suited to the production of trees. Various oaks, sweetgum, eastern cottonwood, and baldcypress are the dominant trees in the wooded areas. The use of equipment in management and harvesting of timber is restricted by flooding and wetness. Plant competition is a concern in woodland management.

These soils are not suited to building site development because of wetness, flooding, and the high shrink-swell potential of the clayey layers. They are not suited as sites for septic tank absorption fields because of flooding and slow percolation and are poorly suited as sites for roads and streets because of flooding, high shrink-swell potential, and low strength.

4. Memphis-Adler

Gently sloping to steep, well drained, silty soils on the

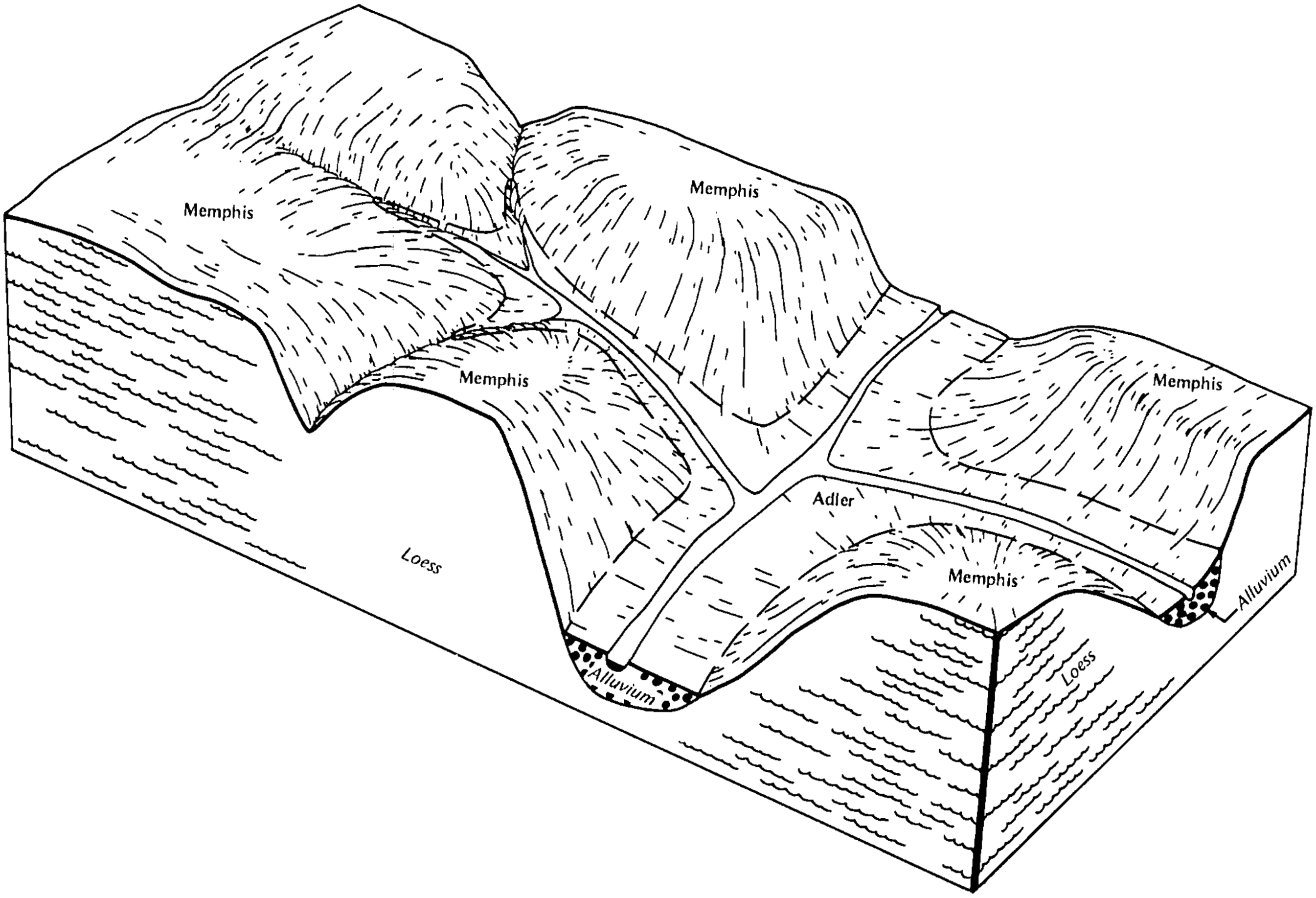


Figure 2.—Typical pattern of soils and underlying material in the Memphis-Adler general soil map unit.

uplands, formed in loess; and nearly level, moderately well drained, silty soils along narrow drainageways, formed in recent alluvium

This map unit is on highly dissected uplands generally in the westernmost part of the loess belt (fig. 2). The combined thickness of the loess layers ranges from 20 to 80 feet. This map unit is long, narrow branching ridges that have steep side slopes and gently sloping tops. Long, narrow flood plains interfinger between these ridges. The slopes range from 2 to 40 percent except some areas along the bluff are as much as 60 percent.

This map unit makes up about 30 percent of the county. It is about 65 percent Memphis soils, 15 percent Adler soils, and 20 percent soils of minor extent.

Memphis soils are on long, narrow, gently sloping to moderately sloping ridgetops and on moderately steep and steep dissected side slopes. These soils have a surface layer of dark yellowish brown silt loam. The subsoil and substratum are dark brown silt loam.

Adler soils are on narrow, nearly level flood plains along drainageways. These soils have a surface layer of brown silt loam. The underlying material is silt loam. The upper part is brown with gray mottles, and the lower part is mottled in shades of brown and gray.

The minor soils are Loring soils on some less sloping side slopes. Small areas of Morganfield and Convent soils are on some flood plains.

Most of the nearly level to steep areas of this map unit have been cleared and are used for row crops. Most of the pasture is in the steep areas in the map unit. Much of the very steep to steep acreage remains in woodland. Soybeans is the major crop. Small acreages are planted to cotton and corn. Wheat and soybeans are double cropped on some of the acreage. Vegetable truck crops are grown on some of the long, narrow ridgetops and flood plains. Scattered areas of residential development are on some gently sloping and sloping ridgetops.

The suitability of the soils in this map unit for row

crops is variable. Soils on the gently sloping to sloping ridgetops are well suited to row crops, although erosion is a hazard. Soils on the steeper side slopes are poorly suited to row crops because of the severe erosion hazard.

The soils in this map unit are well suited to pasture and hay production. Pasture is difficult to establish and maintain on the steeper slopes, and erosion can be a problem until the pasture plants are well established.

These soils are well suited to the production of trees. Oak, hickory, and yellow poplar are the dominant trees in most mature stands. The steep slopes are the major concern in woodland management because of the erosion hazard and limitations affecting the use of equipment.

Soils in the upland parts of this map unit are well suited to residential development. Slope is a severe limitation affecting urban uses in steep and very steep areas. Soils on the narrow flood plains are not suited to these uses because of flooding. Soils on the uplands generally are well suited as sites for septic tank absorption fields except in steep and very steep areas. Low soil strength is a severe limitation on sites for roads and streets.

5. Memphis-Loring

Gently sloping to steep, well drained, silty soils and gently sloping to moderately steep, moderately well drained, silty soils that have a fragipan, formed in loess

This map unit consists of loess uplands on broad ridges and hills (fig. 3). Most ridgetops are wide and are undulating to rolling. Side slopes are long and sloping, or they are short and moderately steep to steep. Long, narrow flood plains are between the ridges. The slopes range from 2 to 20 percent.

This map unit makes up about 15 percent of the county. It is about 35 percent Memphis soils, 30 percent Loring soils, and 35 percent soils of minor extent.

Memphis soils are on broad, gently sloping and moderately sloping ridgetops in rolling to hilly areas and on some moderately steep to steep side slopes in more highly dissected areas. These soils have a surface layer of dark yellowish brown silt loam. The subsoil and substratum are dark brown silt loam.

Loring soils are on moderately sloping to strongly sloping side slopes on rolling to hilly uplands and on gently sloping ridgetops and moderately sloping side slopes on lower, less sloping uplands. These soils have a surface layer of dark brown silt loam. The subsoil is dark yellowish brown silt loam. The fragipan is dark yellowish brown and dark brown silt loam that has mottles in shades of brown and gray.

The minor soils are Adler soils on long, narrow flood plains and Grenada and Calloway soils on long, gently sloping side slopes and foot slopes.

In most areas, the soils in this map unit have been cleared and are used for row crops. Some areas are used for pasture, and a few small areas that are mostly in the steep parts of the map unit remain in woodland. Soils on some of the nearly level ridgetops are used for residential sites. Soybeans is the major crop. Some acreage has been planted to cotton and corn. Wheat and soybeans are double cropped on some of the acreage. Vegetable truck crops are grown on some of the gently sloping ridgetops and on the nearly level flood plains.

The suitability of the soils in this map unit for row crops is variable. Soils on the gently sloping to sloping ridgetops and side slopes are well suited or moderately suited to row crops, although erosion is a hazard on these soils. The low available water capacity is a limitation in eroded areas of Loring soils. Soils on the steeper side slopes are poorly suited to row crops because of the erosion hazard.

The soils in this map unit are well suited to pasture and hay production. The low available water capacity is a limitation in some areas of eroded Loring soils, and erosion is a hazard in more sloping areas during establishment of the pasture plants and if pastures are not properly maintained.

The soils in this map unit are well suited to the production of trees. The few small areas remaining in woodland are in mixed hardwoods. Various oaks and hickories, sweetgum, and yellow poplar are the dominant trees in the wooded areas. Erosion control on the steeper slopes is a concern in woodland management as well as the slope and seasonal wetness that limit the use of equipment in the management and harvesting of timber.

The suitability of the soils in this map unit for building sites is variable, and these soils are poorly suited to roads and streets because of low strength. Memphis soils that are on gently sloping to sloping ridgetops are well suited to building site development. Loring soils are poorly suited as sites for excavation and construction of houses with basements because of wetness and a seasonal perched water table. Slope is an additonal limitation in steeper areas of these soils. Loring soils are poorly suited to septic tank absorption fields because of slow percolation and seasonal wetness, and slope is an additional limitation in steeper areas.

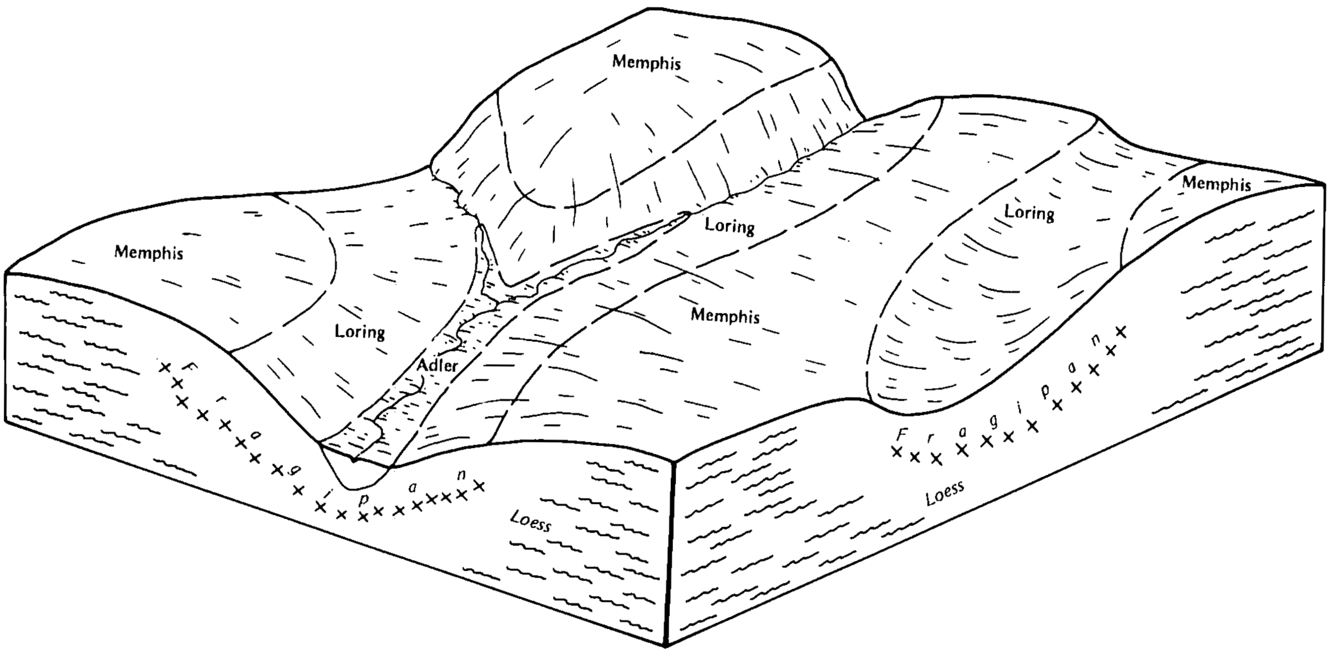


Figure 3.—Typical pattern of soils and underlying material in the Memphis-Loring general soil map unit.

6. Grenada-Loring-Calloway

Gently sloping to moderately steep, moderately well drained soils and nearly level, somewhat poorly drained soils; all are silty and have a fragipan, formed in loess

This map unit consists of broad, nearly level to hilly loess uplands and old loess-covered terraces (fig. 4). Much of this map unit is adjacent to the flood plain of Cane Creek and to parts of the flood plain of the Forked Deer and Hatchie Rivers. These areas form a bench between the flood plains and the steeper, more highly dissected loess uplands. The soils in this map unit are more sloping and dissected near the flood plain and are less sloping with indistinct drainage patterns near the drainage divides. The slopes range from 0 to 12 percent.

This map unit makes up about 5 percent of the county. It is about 35 percent Grenada soils, 20 percent Loring soils, 15 percent Calloway soils, and 30 percent soils of minor extent.

Grenada soils generally are on the sides or on the tops and sides of broad, gently sloping or moderately sloping ridges. These soils have a surface layer of brown silt loam. The subsoil is dark yellowish brown and yellowish brown silt loam. The fragipan is mottled gray, dark brown, and brown silt loam.

Loring soils are on the gently sloping to strongly sloping uplands, mostly adjacent to the flood plains. These soils have a surface layer of brown silt loam. The subsoil is dark yellowish brown silt loam. The fragipan is dark yellowish brown and dark brown silt loam that has mottles in shades of brown and gray.

Calloway soils generally are on nearly level foot slopes and parts of old loess-covered terraces. These soils have a surface layer of dark brown silt loam. The upper part of the subsoil is yellowish brown and light yellowish brown silt loam. The fragipan is silt loam. The upper part is grayish brown with brown mottles. The lower part is mottled in shades of gray and brown.

The minor soils are Center soils on nearly level terraces and Adler soils on narrow flood plains.

Most of the acreage in this map unit has been cleared and is used for row crops. Soybeans is the major crop. Smaller acreages have been planted to cotton and corn. Wheat and soybeans are double cropped on much of the acreage. Small isolated areas are used as pasture or woodland. Some areas are used for residential or industrial development.

The soils in this map unit have moderate suitability for row crops. The hazard of erosion and the limited available water capacity are the main limitations affecting row crops. These limitations are more severe

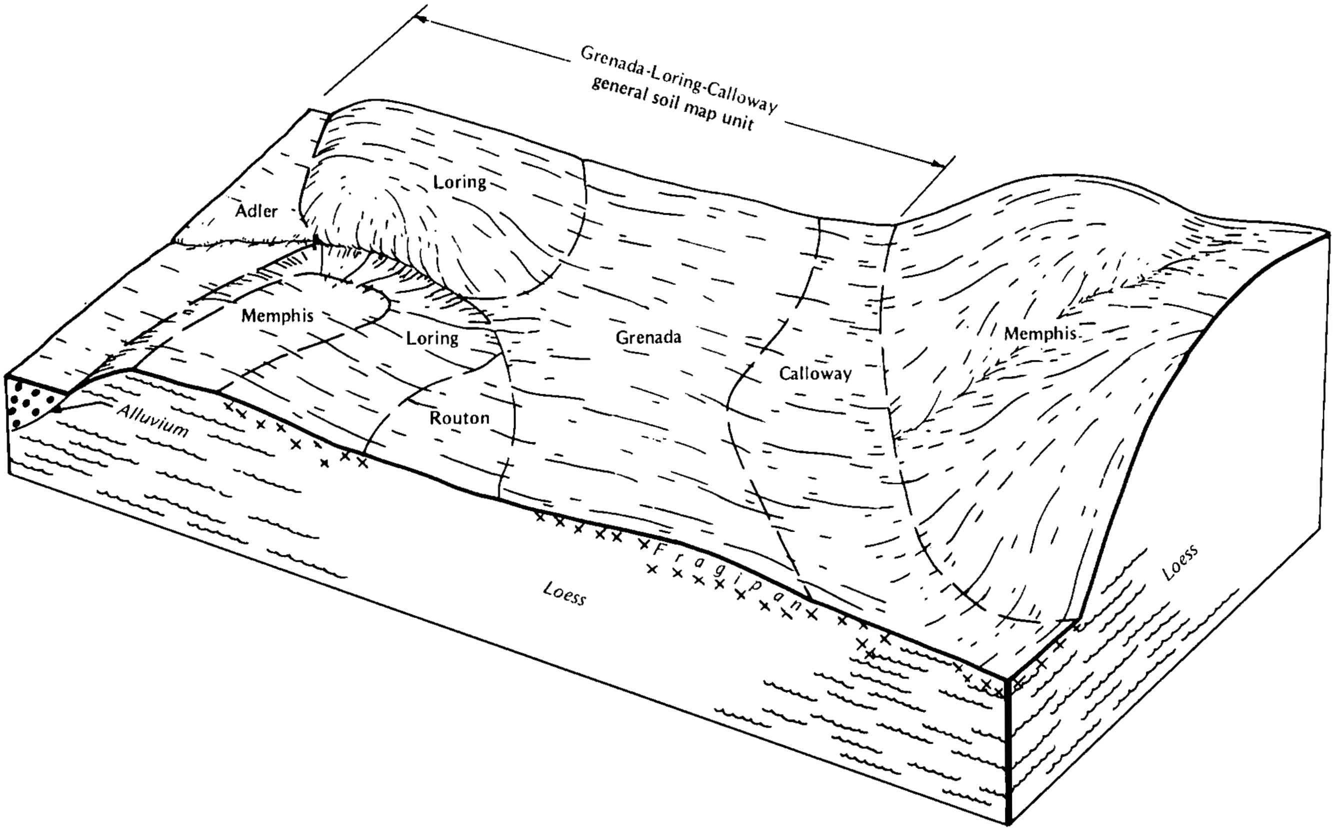


Figure 4.—Typical pattern of soils in the Grenada-Loring-Calloway general soil map unit.

in the steeper, more severely eroded areas.

The soils in this map unit are well suited to pasture and hay production.

These soils are moderately suited to the production of trees. The few small scattered woodlots which remain are in mixed hardwoods. There are no limitations affecting the use of these soils as woodland.

These soils are moderately suited to poorly suited to building site development because of wetness and low strength. They are poorly suited as sites for septic tank absorption fields because of slow percolation and wetness. Low soil strength is a severe limitation on sites for local roads and streets.

7. Rosebloom-Arkabutla-Adler

Poorly drained to moderately well drained, silty soils, formed in recent alluvium

This map unit is on the flood plains of the Forked Deer River and its tributaries. The slopes generally are flat. Depressional areas are common. A few areas are slightly higher and the slopes are convex. The slopes range from 0 to 2 percent.

This map unit makes up about 2 percent of the county. It is about 35 percent Rosebloom soils, 25 percent Arkabutla soils, 20 percent Adler soils, and 20 percent soils of minor extent.

Rosebloom soils are in slack-water areas that flood frequently and often remain flooded for long periods. These soils have a surface layer of brown silt loam. The subsoil is dark gray and gray silt loam and silty clay loam. Mottles are in shades of red, brown, and gray.

Arkabutla soils are in slightly higher positions on the landscape and do not flood as frequently or remain flooded as long as Rosebloom soils. The surface layer of Arkabutla soils is brown silt loam. The upper part of the subsoil is brown silt loam that has mottles in shades of red and brown. The lower part is gray silt loam and silty clay loam. Mottles are in shades of brown and red.

Adler soils on the Forked Deer River flood plain are

on natural levees and in areas where tributary streams have deposited silty material from local loess uplands. Some areas of Adler soils are on the flood plains of these tributary streams and are the dominant soils. The surface layer of Adler soils is brown silt loam. The underlying material is silt loam. The upper part is brown with gray mottles, and the lower part is mottled in shades of brown and gray.

The minor soils are Convent soils. These soils are in similar positions on the landscape as Arkabutla and Adler soils.

Most of the acreage in this map unit has been cleared and is used for row crops. Many areas remain in woodland, mostly in low, wet areas. Soybeans is the major crop. A few areas have been planted to grain sorghum. Corn, cotton, and wheat are grown in a few areas where a drainage system and flood control structures have been installed and maintained.

Soils in this map unit on which some type of drainage system and flood control structures have been installed and maintained are moderately suited to row crops, such as soybeans, that can be planted late in the growing season and are tolerant to wetness. Because of the wetness and flooding of most areas of this map unit, the soils are poorly suited to crops, such as cotton and corn. Adler soils that are on the flood plains of smaller tributary streams are more suited to a wide variety of row crops.

These soils are poorly suited to pasture and hay production because of flooding and wetness.

The soils in this map unit are moderately suited to the production of trees. Trees that are tolerant to wetness and flood conditions grow well on these soils. Wetland oaks, sweetgum, ash, and baldcypress are the dominant trees in wooded areas. Wetness and flooding are the main limitations affecting the use of equipment in woodland management and harvesting of timber. The soils that are subject to wetness are better suited to tree production than to crop production.

The soils in this map unit are not suited to building site development because of the flooding hazard. These soils are not suited as sites for septic tank absorption fields because of flooding and slow percolation. They are poorly suited as sites for roads and streets because of flooding and low strength.

8. Amagon-Oaklimeter-Adler

Poorly drained, silty soils, formed in old alluvium; moderately well drained, silty soils, formed in recent alluvium over old alluvium; and moderately well drained, silty soils, formed in recent alluvium

This map unit consists of the flood plains of the Hatchie River and its tributaries (fig. 5). On the Hatchie River flood plain are wide, flat slack-water areas and broad, slightly convex, natural levees along old meanders of the river channel. Old sloughs and depressions, which are the remnants of old stream channels, are common on the flood plain. The flood plains of the tributary streams are long and narrow, and slopes are mostly flat. There are a few shallow depressions.

This map unit makes up about 5 percent of the county. It is about 55 percent Amagon and Oaklimeter soils that are mapped as a single unit, about 20 percent Adler soils, and 25 percent soils of minor extent.

Amagon soils are in broad, flat to depressional areas. These soils have a surface layer of brown silt loam. The overwash material below the surface layer is light brownish gray with brown mottles. The subsoil is gray and light brownish gray silt loam, silty clay loam, and loam that is mottled in shades of brown.

Oaklimeter soils are on broad, slightly convex natural levees. These soils have a surface layer of dark brown silt loam. The upper part of the subsoil is dark brown silt loam mottled in shades of gray and brown. The lower part is light gray and grayish brown silt loam mottled in shades of brown.

Adler soils are on the flood plains of the smaller tributary streams and in areas where alluvium has been deposited on the Hatchie River flood plain by these streams. These soils have a surface layer of brown silt loam. The underlying material is silt loam. The upper part is brown with gray mottles, and the lower part is mottled in shades of brown and gray.

The minor soils are Rosebloom soils in old channels and depressions and Dubbs, Askew, and Routon soils in slightly higher terrace positions.

Most of the acreage in this map unit is in woodland. Some areas, mostly in the smaller tributary creek bottoms, have been cleared and are used for row crops. Soybeans is the major crop in the cleared areas. Small areas have been planted to cotton, corn, grain sorghum, and small grains.

The soils in this map unit are poorly suited to use for row crops except for some areas of Adler soils. Flooding and wetness are the main limitations affecting crop production. Some areas of Adler soils on the flood plains of the tributary creeks, which do not flood frequently, are well suited to a wide variety of crops.

Most of the soils in this map unit are poorly suited to pasture and hay production because of flooding and wetness.

The soils in this map unit are well suited to the

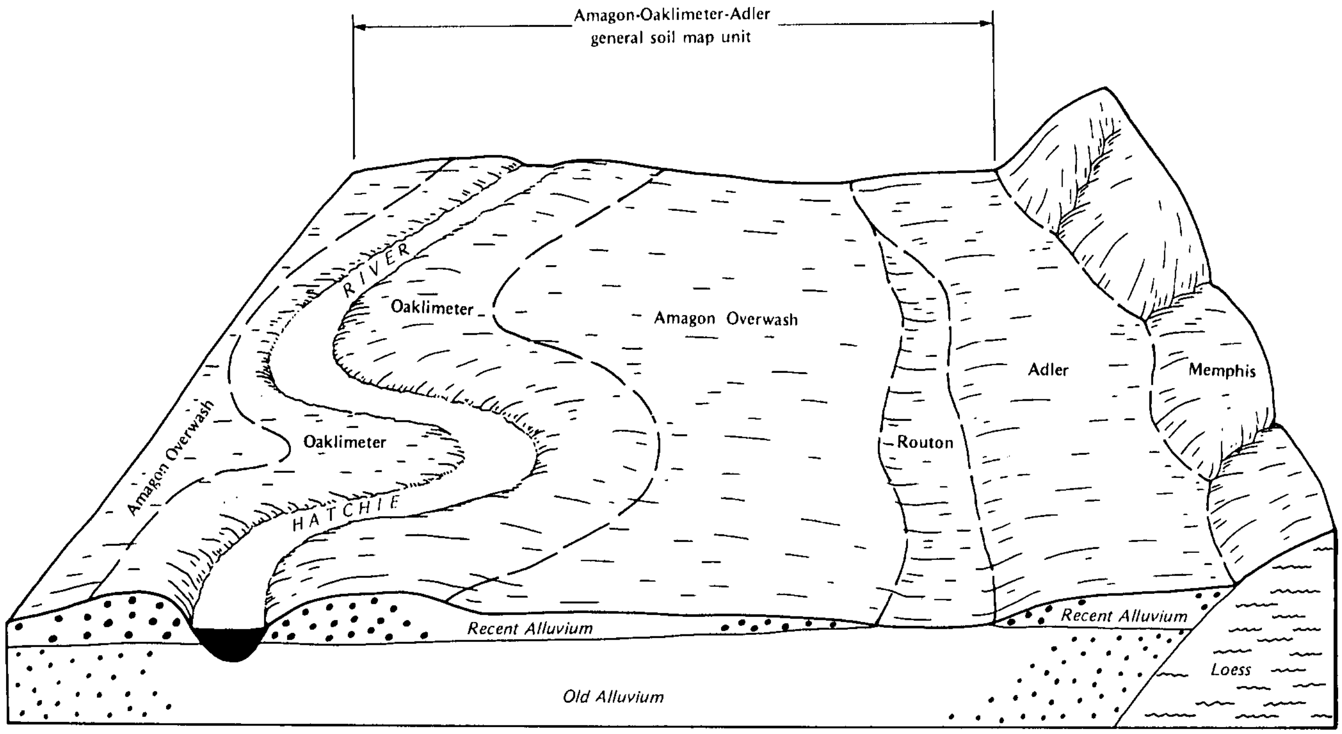


Figure 5.—Typical pattern of soils and underlying material in the Amagon-Oaklimeter-Adler general soil map unit on the Hatchie River flood plain.

production of trees that are tolerant to flooding and wetness. Overcup oak, swamp white oak, swamp chestnut oak, willow oak, sweetgum, ash, and elm are the dominant trees in the wooded areas. In areas of moderately well drained soils, various hickories, cherrybark oak, and southern red oak are the dominant trees. Baldcypress and water tupelo are the dominant trees in the wetter areas. Flooding and wetness are the main limitations affecting the use of equipment in woodland management and harvesting of timber.

The soils in this map unit are poorly suited to building site development because of wetness and flooding. These soils are not suited as sites for septic tank absorption fields because of flooding and wetness. They are poorly suited as sites for local roads and streets because of flooding and low strength.

9. Adler-Convent-Morganfield

Well drained to somewhat poorly drained, silty soils, formed in recent alluvium

This map unit is on the flood plains of the major creeks and on the flood plain of the Mississippi River where silty alluvium from loess has been deposited. These areas generally are long and narrow. The slopes range from 0 to 2 percent.

This map unit makes up about 6 percent of the county. It is about 40 percent Adler soils, 20 percent Convent soils, 20 percent Morganfield soils, and 20 percent soils of minor extent.

Adler soils generally are between Convent and Morganfield soils on the flood plains. These soils have a surface layer of brown silt loam. The underlying material is silt loam. The upper part is brown with gray mottles, and the lower part is mottled in shades of brown and gray.

Convent soils are in lower positions on the flood plains, generally away from the main stream channels. These soils have a surface layer of brown silt loam. The upper part of the underlying material is grayish brown and dark grayish brown silt loam that has mottles in shades of brown and yellow. The lower part is grayish brown silt loam that has mottles in shades of brown and gray.

Morganfield soils are in higher positions on the flood plains, along stream channels, and on flood plains of

small tributaries. These soils have a surface layer of brown silt loam. The underlying material is silt loam. The upper part is dark brown with mottles in shades of brown. The lower part is mottled in shades of brown.

The minor soils are Routon and Rosebloom soils in low areas along the flood plains of the creeks and Dundee soils at the edge of the Mississippi River flood plain.

About 80 percent of the acreage of this map unit has been cleared and is used for row crops. Soybeans and cotton are the main crops. Scattered blocks of mixed hardwoods are mostly in the low, wet parts of the flood plain.

The soils in this map unit are well suited to row crops, such as cotton, corn, and soybeans. High yields can be expected in most years. Natural fertility is medium. The soil reaction ranges from medium acid to neutral. Moderate amounts of fertilizer are needed for optimum yields, and little or no lime is required.

The soils in this map unit are moderately suited to pasture because of seasonal wetness.

The soils in this map unit are well suited to the production of trees that are tolerant to seasonal wetness and occasional flooding. Various oaks, sweetgum, and green ash are the dominant trees in the wooded areas. Flooding and wetness are severe limitations affecting use of equipment in managing and harvesting timber.

The soils in this map unit are poorly suited to building site development because of wetness and flooding. These soils are poorly suited as sites for septic tank absorption fields because of flooding and the seasonal high water table. They are poorly suited as sites for local roads and streets because of flooding and low strength.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Loring silt loam, 2 to 5 percent slopes, eroded, is one of several phases in the Loring series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Gullied land-Memphis complex, very steep, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Amagon overwash and Oaklimeter silt loams, frequently flooded, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Gullied land is an example. Miscellaneous areas are shown on the soil maps. Some that are too small to be shown are identified by a special symbol on the soil maps.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Soil Descriptions

Ad—Adler silt loam, occasionally flooded. This soil is deep, nearly level, and moderately well drained. It is on the flood plains and in drainageways on loess uplands. Most areas are subject to occasional flooding, generally in the winter and early in the spring. Flooding generally is of brief duration. The mapped areas are typically long, narrow, and branching and range from 5 to 1,000 acres. The slopes range from 0 to 2 percent.

Typically, this soil has a surface layer of brown silt

Figure 6.—This area of Adler silt loam, occasionally flooded, is better suited to pasture than to cropland because of the numerous drainage ditches that dissect the area.

loam about 6 inches thick. The upper part of the underlying material, to a depth of 21 inches, is brown silt loam that has mottles in shades of gray and brown. The lower part to a depth of 60 inches is mottled brown and gray silt loam.

Included with this soil in mapping are a few intermingled areas of Morganfield and Convent soils. Morganfield soils are well drained, and Convent soils are somewhat poorly drained. Also included are areas of rarely flooded soils below flood control dams in the Cane Creek watershed and a few intermingled areas of a soil that is strongly acid in one or more layers.

The permeability of this soil is moderate. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium to high. The soil reaction ranges from medium acid to neutral. Surface runoff is slow, and the hazard of erosion is none or slight. This soil has good tilth and can be worked throughout a fairly wide range of moisture content. The water table is within 2 or 3 feet of the surface sometimes during the winter and spring. Rooting depth is not limited during the growing season. The seasonal high water table can affect the roots of some perennial plants during the winter and spring.

Most of the acreage of this soil has been cleared and is used for row crops. A few small areas are used as pasture (fig. 6) or woodland.

Adler soil is well suited to most row crops, vegetable crops, and small grains. High yields are possible in most years if proper management practices are used. This soil responds well to fertilizer. Soil test recommendations for the use of fertilizer and lime should be followed for maximum yields. In wet years, this soil dries out and also warms up slowly, which delays planting and can result in poor stands. Cotton grows rank and matures late if the summer is

excessively wet, especially when excessive nitrogen fertilizer is used. Flooding, which occurs mainly in winter and early in the spring, can damage small grain crops. Small grains are more productive in areas where flooding occurs less often and surface water runs off. Subsurface drainage generally is not needed but can be helpful in wet places. Land leveling and open ditches help in draining depressional areas where water ponds.

This soil is well suited to most commonly grown pasture and hay crops. Fescue or bermudagrass, in combination with white clover, is the most widely used pasture grass. This soil is also well suited to summer annual grasses, but it is not suited to alfalfa or to other plants that are sensitive to wetness.

This soil is well suited to woodland. Most hardwoods and pines that are tolerant to some wetness are well adapted to this soil. Woodland areas are mainly small woodlots and revegetation on idle land. Eastern cottonwood, American sycamore, sweetgum, and various oaks are the predominant trees in the wooded areas. Wetness is a limitation that affects the use of conventional equipment, which causes soil compaction. Plant competition is a moderate concern in management.

Flooding is a severe hazard on residential, commercial, or industrial building sites. Corrective measures to control flooding generally are not practical because of the high cost and some risk of damage to the property after the measures are applied.

Because of flooding and wetness, this soil is not suitable as a site for septic tank absorption fields. An alternate site should be selected.

Flooding is a severe hazard on sites for roads and streets. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Adler soil is in capability subclass IIw.

Am—Amagon silty clay loam, overwash, frequently flooded. This soil is deep, nearly level, and poorly drained. It is in low, flat areas and in long, narrow depressions north of Chisholm Lake on the Mississippi River flood plain. In most areas, this soil is subject to flooding each year in the winter and spring. Many areas are ponded for several days. The mapped areas range from 5 to 375 acres. The slopes are 0 to 2 percent.

Typically, this soil has a surface and subsurface layer of dark brown and light brownish gray silty clay loam recent deposition about 10 inches thick. The buried subsurface layer, to a depth of 16 inches, is gray silt loam. The upper part of the subsoil, to a depth of 46 inches, is gray silt loam and silty clay loam. The lower part, to a depth of 55 inches, is light brownish gray loam. The substratum to a depth of 62 inches is grayish brown loam.

Included with this soil in mapping are a few areas of Dundee soils that are generally in higher positions on the landscape than Amagon soil and are somewhat poorly drained.

The permeability of this soil is slow. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid to slightly acid in the surface layer and upper part of the subsoil and slightly acid to neutral in the lower part of the subsoil and substratum. Surface runoff is very slow, and erosion is not a hazard. This soil has very poor tilth because of the clayey texture of the surface layer and excessive wetness. The water table is at or near the surface during most of the winter and spring and is at a depth of 3 to 6 feet during much of the summer and fall. The root zone is affected by and corresponds to the depth to the water table, especially for plants that are sensitive to wetness.

Most of the acreage in this map unit has been cleared and is used for row crops. Some areas are used as woodland, and some small areas are in weeds and brush because they are too wet to cultivate.

Areas of this Amagon soil that have been artificially drained are moderately suited to crops, such as soybeans, which are tolerant to wetness and do not require a long growing season. This soil is poorly suited to cotton and small grains. Moderate yields of adapted crops can be obtained in years when flooding and wetness are not a problem. Drainage and land leveling are needed to remove standing water and prevent wet areas, which will damage the crops. Subsurface drainage does not work well on this soil because of frequent flooding and slow percolation. Lime and fertilizer requirements of this soil are variable. Soil test recommendations for use of lime and fertilizer should be followed because this soil can need lime and fertilizer from time to time.

The clayey surface of this soil, which is one of several soils in the survey area referred to as "gumbo," makes plowing difficult and hinders seedling emergence. It is critical that this soil be plowed at the correct moisture content to prepare a good seedbed and to prevent large, extremely hard clods from forming. Dense, compacted plowpans, which restrict root growth and water infiltration, also tend to form easily in clayey soils. Limiting or consolidating trips across the field with heavy equipment, especially when the field is too wet, will help decay or prevent formation of plowpans.

This soil is poorly suited to most hay and pasture

plants because of wetness and flooding. It is better suited to pasture plants that are tolerant to wetness or to summer annuals. This soil is not suited to alfalfa.

This soil is moderately suited to hardwood trees that are tolerant to wet conditions. Woodland areas consist of small to moderate size blocks that have not been cleared because of wetness. Green ash, eastern cottonwood, baldcypress, and various oaks are the dominant trees in the wooded areas. Flooding and wetness severely restrict the use of equipment in managing and harvesting timber; therefore, operations involving heavy equipment are easier to accomplish in the summer and fall. Plant competition is a severe problem for new plantings.

Wetness is a severe limitation on residential, commercial, or industrial building sites, and flooding is a severe hazard. Drainage ditches and leveling or sloping the site will remove excess water. Corrective measures to control flooding generally are not practical because of the high cost and some risk of damage to the property after the measures are applied.

Because of the slow percolation rate, the high water table, and flooding, this soil is not suitable as a site for septic tank absorption fields. An alternate site should be selected.

Low strength is a severe limitation on sites for roads and streets, and flooding is a severe hazard. The use of a coarse-grained subgrade or base material will prevent buckling and cracking, which are caused by low soil strength. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Amagon soil is in capability subclass Vw.

AO—Amagon overwash and Oaklimeter silt loams, frequently flooded. The soils in this map unit are deep, nearly level, and poorly drained and moderately well drained. These soils are on the flood plain of the Hatchie River. Amagon overwash material is poorly drained and generally is in low, flat areas. Oaklimeter soil is moderately well drained and is on slightly higher ridges than Amagon soil or is on natural levees. Amagon soil has an overwash layer of about 10 to 20 inches of brown recent alluvium. Old stream channels and sloughs are throughout the area. This map unit is subject to flooding by the Hatchie River, generally from December through May in most years, but flooding can occur at almost any time. Most areas of this soil are flooded at least once a year, and some areas are inundated for several weeks. The mapped areas range from 10 to 800 acres. The slopes range from 0 to 2 percent.

Individual areas of this map unit vary in the amount of each soil, but in this map unit the average is about 45 percent Amagon overwash, 30 percent Oaklimeter soil, and 25 percent other similar soils.

Typically, this Amagon overwash soil has a surface layer of brown silt loam recent deposition about 15 inches thick that is mottled in shades of brown and gray. The buried surface layer, to a depth of 25 inches, is light brownish gray silt loam. The subsoil, to a depth of about 56 inches, is light brownish gray silt loam and silty clay loam. Mottles are in shades of brown. The substratum to a depth of about 62 inches is grayish brown silt loam that has mottles in shades of brown, or it is brown silt loam that has mottles in shades of gray.

Typically, this Oaklimeter soil has a surface layer of dark brown silt loam about 8 inches thick. The subsoil, to a depth of 35 inches, is dark brown silt loam mottled in shades of brown and gray. The upper part of the buried soil, to a depth of 54 inches, is light gray silt loam that has mottles in shades of brown. The lower part to a depth of 72 inches is grayish brown silt loam that has mottles in shades of brown.

Included with these soils in mapping is a silty soil that is well drained and in higher positions on the landscape than the soils in this map unit and a similar soil that has sandy layers. Also included are a few areas of soils that are mostly in sloughs or in low positions on the landscape. These soils are gray.

The permeability is slow in Amagon overwash soil and moderate in Oaklimeter soil. The available water capacity of both soils is high. The content of organic matter is moderate, and the natural fertility is medium. Amagon overwash soil is strongly acid to slightly acid in the surface layer and subsoil and is slightly acid or neutral in the substratum. Oaklimeter soil is strongly acid or very strongly acid. Surface runoff is very slow on both soils, and erosion is not a hazard. Tilth is good on these soils. The water table is at or near the surface during most of the winter and spring and is at a depth of 6 to 10 feet from late in the summer through fall. The root zone is affected by and corresponds to the depth to the water table, especially for plants that are sensitive to wetness.

Most areas of these soils are used as woodland (fig. 7). A few areas have been cleared and are used for row crops.

The soils in this map unit are poorly suited to row crops and pasture because of frequent flooding and wetness. Areas that have been cleared are mostly planted to soybeans, but planting is often delayed in the spring and harvesting is hampered in the fall because of

Figure 7.—Most areas of Amagon overwash and Oaklimeter silt loams, frequently flooded, are used as woodland. These soils are flooded each year in the winter and spring.

flooding. Flooding can also occur in the summer during the growing season.

These soils are well suited to timber production. Bottom-land hardwoods that are tolerant to wetness are well adapted to these soils and produce high yields of marketable timber. Cherrybark oak, pin oak, overcup oak, swamp white oak, swamp chestnut oak, willow oak, sweetgum, green ash, and American elm are the dominant trees. Cherrybark oak, other red oaks, and various hickories are the more dominant trees on the moderately well drained Oaklimeter soil. Baldcypress and water tupelo are dominant in a few low areas that remain flooded for longer periods.

Flooding and wetness severely restrict the use of equipment in managing and harvesting timber; therefore, operations involving heavy equipment generally are limited to the summer or fall. Plant competition and the hazard of flooding are concerns in

establishing seedlings and increasing their rate of growth. Controlling competing vegetation around seedlings will help them survive and will increase the rate of growth. Planting in sufficient numbers and at times that will allow the seedlings to develop before flooding occurs will help ensure good stands. The increase in acreage of row crops in recent years has caused an increase in erosion and runoff from the uplands, intensifying siltation of the Hatchie River channel. As a result, the frequency and duration of flooding of the Hatchie River flood plains has increased. Flooding also occurs later in the growing season. This frequency of flooding has increased stress on trees and, in some cases, has killed some trees that are less tolerant to wetness. If this flooding trend continues, more damage to timber will result.

Wetness is a severe limitation on residential, commercial, or industrial building sites, and flooding is a severe hazard. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

These soils are not suitable as sites for septic tank absorption fields because of the slow percolation rate, seasonal high water table, and flooding. Alternate sites should be selected.

Low strength is a severe limitation on sites for roads and streets, and flooding is a severe hazard. Using a coarse-grained subgrade or base material and using special construction and reinforcement will prevent buckling and cracking, which are caused by low soil strength. Raising the roadbed will help control flooding but is very expensive. It can be a feasible solution to the problem in some places if other alternatives are not available.

The soils in this map unit are in capability subclass Vw.

Ar—Arkabutla silt loam, frequently flooded. This soil is deep, nearly level, and somewhat poorly drained. It is on the flood plain of the Forked Deer River. Even in areas that are protected by levees, most areas of this soil are subject to flooding at least once a year, generally from December through May. The lower-lying, unprotected areas can be inundated for several days. The mapped areas are generally elongated and are parallel to the river channel. They range from 5 to 150 acres. The slopes are 0 to 2 percent.

Typically, this soil has a surface layer of brown silt loam about 5 inches thick. The upper part of the subsoil, to a depth of 14 inches, is brown silt loam that has mottles in shades of red and gray. The next layer, to a depth of 18 inches, is dark gray silt loam mottled in shades of brown and red. The next layer, to a depth of 35 inches, is gray silt loam mottled in shades of red and brown. Below that layer, to a depth of 55 inches, is gray silty clay loam mottled in shades of red and brown. The lower part to a depth of 65 inches is gray silt loam mottled in shades of brown and red.

Included with this soil in mapping are a few areas of Rosebloom soils and a few small areas of Adler soils. The Rosebloom soils are in small depressions and are poorly drained. Adler soils are in higher positions on the landscape than Arkabutla soils and are moderately well drained. Also included are a few intermingled areas of a soil that has one or more layers that are medium acid or slightly acid.

The permeability of this soil is moderate. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid or very strongly acid except where lime has been added. Surface runoff is slow, and erosion is not a hazard. This soil has moderately good tilth, but some areas are difficult to work because of excessive wetness, especially if the surface layer is a heavy silt loam. The high water table is at or near the surface during most of the winter and spring and is at a depth of 3 to 6 feet during the summer and fall. The root zone is affected by and corresponds to the depth to the water table, especially for plants that are sensitive to wetness.

Most areas of this soil have been cleared and are used for row crops. Some areas are in woodland.

Generally, the suitability of this Arkabutla soil for row crops or pasture depends on the amount of drainage and protection from flooding that is provided. Without some protection from flooding and wetness, which delay planting and reduce stands, this soil is poorly suited to crops. With a good drainage and levee system, this soil is suited to a wider variety of crops, and higher yields can be obtained. Most of the areas that are used for row crops have an artificial drainage system, and many areas are protected from flooding. Open ditches, levees, pumping systems, and land leveling are practices that are commonly used to overcome wetness and flooding. Subsurface drainage generally is not effective because of the frequency and duration of flooding. Regulations regarding drainage should be checked before any drainage system work is considered. This soil is moderately suited to soybeans and grain sorghum if a drainage system is installed; and it is poorly suited to corn, cotton, and small grains except where extensive drainage systems and levees have been installed.

This soil is poorly suited to hay crops and pasture except in areas that have been drained and protected from flooding. It is moderately suited to hay crops in drained areas but they generally are not economically feasible because of the high cost of installing and maintaining the drainage system. This soil is moderately well suited to summer annual grasses in most areas.

A few areas of this soil are in woodland. These areas are about 10 to 75 acres. Most of the woodlands are in undrained areas that are too wet to farm. This soil is well suited to the production of timber. Bottom-land hardwoods that are tolerant to wetness are well adapted to this soil and produce optimum yields. Baldcypress, water tupelo, willow oak, overcup oak, and wetland oaks are the dominant trees in the wooded areas. Wetness and flooding severely restrict the use of equipment in managing and harvesting timber; therefore, operations involving heavy equipment generally are limited to the summer or fall. Seedling mortality and plant competition are also management problems.

Wetness is a severe limitation on residential, commercial, or industrial building sites, and flooding is a severe hazard. Corrective measures to control flooding generally are not practical because of the high cost and some risk of damage to the property after the measures are applied.

This soil is not suitable as a site for septic tank absorption fields because of flooding and the seasonal high water table. An alternate site should be selected.

Low strength is a severe limitation on sites for roads and streets, and flooding is a severe hazard. The use of a coarse-grained subgrade or base material and using special construction and reinforcement will prevent buckling, which is caused by low soil strength. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Arkabutla soil is in capability subclass IVw.

As—Askew silt loam, occasionally flooded. This soil is deep, nearly level, and moderately well drained. It is on low stream terraces adjacent to the flood plains. Most areas are subject to flooding, usually in the winter and early in the spring. Flooding is mostly of brief duration, but severe flooding can inundate the lower areas for long periods. The mapped areas vary in shape and range from 5 to 50 acres. The slopes range from 0 to 2 percent.

Typically, this soil has a surface layer of brown silt loam about 9 inches thick. The upper part of the subsoil, to a depth of about 27 inches, is yellowish brown silt loam that has mottles in shades of gray and brown. The lower part, to a depth of about 38 inches, is light brownish gray silt loam that has mottles in shades of brown. The substratum to a depth of about 60 inches is light brownish gray loam mottled in shades of brown.

Included with this soil in mapping are a few small areas of Routon and Dubbs soils. Routon soils are in lower positions on the landscape than Askew soil and are poorly drained. Dubbs soils are in higher positions and are well drained.

The permeability of this soil is moderate. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction is medium acid to very strongly acid. Surface runoff is slow, and erosion is not a hazard. Generally, this soil has good tilth; but in some areas, the soil is slow to dry out in the spring. The high water table is within 1 to 4 feet of the surface during wet periods in the winter and spring. The rooting depth is not a concern, but the seasonal high water table can affect the roots of a few perennial plants.

Most of the acreage of this soil has been cleared and is used for row crops. A few small areas are in woodland.

This Askew soil is well suited to soybeans, and optimum yields can be obtained if fertility and the pH levels are maintained and proper management practices are used. This soil is moderately suited to crops, such as cotton or corn; however, planting may be delayed in the spring because of flooding, and poor crop stands often result because of cold, wet conditions.

Optimum yields of small grains can be obtained in years when flooding is not a problem, but crops can be damaged by flooding and wetness during wet periods. Drainage ditches and land leveling will remove standing water and help to prevent ponding in low places. Soil tests should be used to determine the needs of the soil for fertilizer and lime.

This soil is moderately suited to perennial forage crops, but these crops can be damaged or planting can be delayed because of flooding and standing water. This soil is better suited to pasture plants that are tolerant to wetness and to summer annual forage plants. It is poorly suited to alfalfa because of flooding and wetness.

This soil is well suited to the production of trees, and optimum yields of timber can be produced. The woodland is small blocks and fringes of larger wooded areas along the borders of this map unit. Various oaks and hickories are the dominant trees in the wooded areas. Competing vegetation can crowd out or stunt the growth of desirable seedlings in cutover areas. Controlling competing vegetation around seedlings

allows them to become established and will increase their rate of growth.

Wetness is a severe limitation on residential and commercial building sites, and flooding is a severe hazard. Shaping the site so that water will run off and installing drains around footings will help avoid problems caused by wetness. Corrective measures to control flooding generally are not practical because of the high cost and some risk of damage to the property after the measures are applied.

This soil is not suitable as a site for septic tank absorption fields because of flooding, the high water table, and wetness. An alternate site should be selected.

Low strength is a severe limitation on sites for roads and streets, and flooding is a severe hazard. The use of a coarse-grained subgrade or base material and reinforcement of the roadbed will prevent cracking, which is caused by low soil strength. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Askew soil is in capability subclass IIw.

Aw—Askew silty clay loam, overwash, occasionally flooded. This soil is deep, nearly level, and moderately well drained. It is on the Mississippi River flood plain in slightly convex areas that are slightly higher on the landscape than the surrounding areas. Some areas are subject to flooding by the Forked Deer River. This soil is subject to occasional flooding for brief periods, generally from February through April, and the lower areas are sometimes inundated for more than a week. The mapped areas vary in shape and range from 5 to 90 acres. The slopes are long and smooth and range from 0 to 2 percent.

Typically, this soil has a surface layer of dark brown silty clay loam about 6 inches thick. The underlying material, to a depth of 10 inches, is dark brown silty clay loam mottled in shades of brown. The surface of the buried soil is brown silt loam mottled in shades of brown. The upper part of the subsoil, to a depth of 33 inches, is dark yellowish brown and yellowish brown silt loam mottled in shades of brown and gray. The lower part, to a depth of 48 inches, is dark yellowish brown loam mottled in shades of brown and gray. The substratum to a depth of 62 inches or more is yellowish brown fine sandy loam.

Included with this soil in mapping are a few small areas of Dundee and Dubbs soils. Dundee soils are mostly in depressional areas and are somewhat poorly drained. Dubbs soils generally are in higher positions on the landscape than Askew soil and are well drained. Also included are a few areas where the heavy textured overwash deposition is more than 15 inches thick.

The permeability of this soil is moderately slow in the silty clay loam layers, moderate in the silt loam layers, and moderately rapid in the fine sandy loam layers. The available water capacity is high. The content of organic matter is low, and the natural fertility is high in the silty clay loam depositional layer and medium in the buried soil. The soil reaction is slightly acid or medium acid in the depositional layer and medium acid to very strongly acid in the buried soil. Surface runoff is slow, and the hazard of erosion is none to slight. This soil does not have good tilth because of the heavy texture of the surface layer, and a good seedbed can be difficult to prepare. The high water table is within 1 to 4 feet of the surface sometimes during wet periods in the winter and spring. The rooting depth generally is not affected during the growing season, but the high water table can limit root growth of some perennial plants in the spring and winter.

Most of the acreage of this soil has been cleared and is used for row crops. A few small areas are in woodland.

This Askew soil is moderately suited to row crops; however, the growing season is shortened in some years because of flooding in the spring. It is well suited to soybeans, and optimum yields can be obtained if fertility and proper levels of pH are maintained and good management practices are used. This soil is moderately suited to crops, such as cotton or corn, but planting can be delayed in the spring because of flooding, and poor stands often result because of cold, wet conditions.

This soil is not suited to small grains because of the hazard of flooding in the winter and spring. Drainage ditches and land leveling will remove standing water and help to prevent ponding in low places. This soil is not well suited to subsurface drainage because of occasional flooding. Lime and fertilizer requirements of this soil are variable, and soil tests should be used to determine the needs of the crop.

This soil is moderately suited to perennial hay and pasture plants because of flooding and standing water. It is better suited to perennial plants that are tolerant to wetness and to summer annuals. It is poorly suited to alfalfa because of flooding and wetness.

This soil is well suited to timber production, and optimum yields can be produced. Woodland areas consist mostly of small blocks. Sweetgum and various oaks and hickories are the dominant trees in the wooded areas. Plant competition is the main concern in woodland management. Controlling competing

vegetation around seedlings will help them survive and will increase their rate of growth.

This soil is poorly suited to residential, commercial, or industrial building site development because of flooding and wetness. Corrective measures to control flooding generally are not practical because of the high cost and some risk of damage to the property after the measures are applied. Shaping the site so that water will drain off and establishing drains around footings will help avoid problems caused by wetness.

This soil is not suitable as a site for septic tank absorption fields because of flooding and wetness. An alternate site should be selected.

Low strength is a severe limitation on sites for roads and streets, and flooding is a severe hazard. Using a coarse-grained subgrade or base material and using special construction and reinforcement of the roadbed will prevent buckling and cracking, which are caused by low soil strength. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Askew soil is in capability subclass IIw.

Bo—Bowdre silty clay, occasionally flooded. This soil is deep, nearly level, and somewhat poorly drained. It is on the flood plain of the Mississippi River and is subject to flooding, generally from February through April. Flooding duration generally is only for several days; but in some years, the lower areas are inundated for several weeks. This soil is on the tops of old, natural levees in slack-water areas that formed as a result of the shifting of the river channel. A few areas around sloughs and old channels have short, steep slopes. The mapped areas are 5 to 250 acres. The slopes generally are long and smooth and are dominantly 0 to 2 percent.

Typically, this soil has a surface layer of very dark grayish brown silty clay about 6 inches thick. The subsoil, to a depth of 18 inches, is very dark grayish brown silty clay mottled in shades of brown and gray. In some places, the subsoil is a lighter color. The upper part of the substratum, to a depth of 34 inches, is brown silt loam. The middle part, to a depth of 40 inches, is grayish brown silty clay loam. The lower part to a depth of 60 inches is brown silt loam. The substratum is mottled in shades of gray and brown.

Included with this soil in mapping are small areas of Keyespoint and Robinsonville soils. Keyespoint soils are clayey to a depth of more than 20 inches. Robinsonville soils do not have a clayey surface layer and are well drained. Also included are some small areas of soils that are similar to Bowdre soil but have a coarser textured substratum.

The permeability of this soil is slow in the upper silty clay layers and moderately slow or moderate in the lower loamy layers. The available water capacity is high. The content of organic matter is moderate, and the natural fertility is high. The soil reaction is slightly acid to mildly alkaline. Surface runoff is slow, and erosion is not a hazard. This soil has poor tilth and can only be worked within a narrow range of moisture content. A high water table is at a depth of 1.5 feet for short periods in the winter and early in the spring. The rooting depth generally is not limited; however, in some years, root growth can be limited if the water table remains high for extended periods. This soil has a high shrink-swell potential in the upper clayey layers. These layers shrink and crack as they dry and swell when wet.

About half of the acreage of this soil is used as cropland. The remaining acreage is used as woodland.

This Bowdre soil is moderately suited to row crops that can be planted late in the growing season after the danger of flooding has passed. Wetness and poor tilth are the major limitations affecting crop production, and flooding is a hazard. Optimum yields can be obtained if the crops are suited to late planting and are tolerant to wetness. Applications of fertilizer and lime generally are not needed because of the high natural fertility and level of pH in this soil.

Additional nitrogen generally is needed if cotton, corn, small grains, and summer annual grasses are grown. Soil tests should be used to determine the need of the crops for fertilizer and lime to ensure maximum crop yields. This soil is poorly suited to crops, such as corn and cotton, that require early planting and a long growing season. Plowing the soil into ridges in the fall can help it dry out faster in the spring. This will save steps in seedbed preparation since the seed can be planted directly into the ridges in the spring with minimal additional preparation. Subsurface drainage systems are not effective in this soil because of flooding and the slow permeability in the clayey layers. This soil is poorly suited to small grains because of the flooding hazard. In some years, small grains are grown in some of the higher areas, but even fields in the highest areas can be damaged by flooding.

This soil and several soils on the Mississippi River flood plain that have a clayey surface are sometimes locally referred to as "gumbo." The clayey surface of Bowdre soil makes plowing difficult and hinders seedling emergence. It is critical that the soil be plowed at a favorable moisture content to prepare a good seedbed. Large, extremely hard clods form if the soil is plowed when it is too wet or too dry. Compacted plowpans tend to form in the clayey soils if they are

worked over long periods with heavy equipment. These plowpans restrict root growth and water infiltration. Farming operations involving heavy equipment should be kept to a minimum, especially when the soil is wet, and the content of organic matter should be kept as high as possible to help prevent formation of plowpans.

This soil is poorly suited to pasture and hay crops, including alfalfa, because of excessive wetness and flooding in winter and spring. It is better suited to hay crops that are tolerant to wetness and to summer annual grasses.

The potential of this soil for the production of trees is high. Large areas, mostly in the Anderson-Tully Wildlife Management Area, are used for timber production. This soil is well suited to most hardwoods that are tolerant to wetness. American elm, sugarberry, pecan, and sweetgum are the dominant trees in the wooded areas. Wetness and flooding moderately restrict the use of heavy equipment in managing and harvesting timber; therefore, operations involving heavy equipment are easier to accomplish in the summer and fall. Seedling mortality and plant competition are also management problems.

Wetness and high shrink-swell potential in the upper, clayey layers are severe limitations on building sites, and flooding is a severe hazard. Corrective measures to control flooding and to reduce the shrinking and swelling of this soil generally are not practical because of the high cost and some risk of damage to the property after the measures are applied.

This soil is not suitable as a site for septic tank absorption fields because of flooding and wetness. An alternate site should be selected.

Flooding is a severe hazard on sites for roads and streets. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Bowdre soil is in capability subclass IIIw.

Br—Bruno loamy fine sand, occasionally flooded. This soil is deep, nearly level to undulating, and excessively drained. It is on the Mississippi River flood plain and is subject to flooding, mainly from February through April. The duration of flooding generally is only for a few days, but severe flooding can inundate the area for a longer period, depending on the position of the soil on the landscape. Most areas of this soil are on natural levees adjacent to the Mississippi River. Some areas are on old natural levees or ridges that are farther away from the present river channel. A few small areas of this soil formed in sandy alluvium at the base of the bluff. The areas adjacent to the Mississippi River are subject to water erosion, expansion by deposition, or to being reshaped or dissected by floodwater. The mapped areas range from 5 to 550 acres. The slopes are irregular in shape and vary in length. They range from 0 to 5 percent.

Typically, this soil has a surface layer of dark brown loamy fine sand about 6 inches thick. The underlying material to a depth of 60 inches is stratified layers of brown, yellowish brown, and pale brown sand, very fine sandy loam, loam, loamy fine sand, and loamy sand.

Included with this soil in mapping are a few areas of Commerce soils and a few intermingled areas of Robinsonville soils. Commerce soils are in low depressional areas and are somewhat poorly drained. Robinsonville soils are well drained. Also included are some frequently flooded sandbars and small islands in the Mississippi River.

The permeability of this soil is rapid. The available water capacity is low. The content of organic matter is low, and the natural fertility is medium. The soil reaction ranges from medium acid to moderately alkaline. Surface runoff is slow. Generally, erosion is not a hazard; but on a few of the more steep slopes, the hazard of erosion is slight. This soil has good tilth and can be worked throughout a wide range of moisture content. The rooting depth generally is not limited.

Most of the acreage of this soil has been cleared and is used for pasture, hay, row crops, or specialty crops. Some areas are used as woodland. A few recently deposited areas near the Mississippi River are in weeds and brush or have been left bare.

The low available water capacity of this Bruno soil is the main limitation affecting crop production, and flooding is a hazard. Crops, such as corn and soybeans, generally are not profitable because of droughtiness. This soil is only moderately suited to an irrigation system because water infiltrates and percolates through the soil rapidly. The soil reaction is favorable to most crops, and lime generally is not needed. The capacity of this soil to hold plant nutrients is low, and fertilizer, especially nitrogen fertilizer, is leached out rapidly. This soil is moderately suited to crops, such as watermelons, sunflowers, and grain sorghum, that are drought tolerant, but even these crops will not produce well in dry years. Small grain yields are moderate in some years. If conditions are dry at planting time, poor stands will result. Flooding in the winter and spring can damage small grain crops, and inadequate rainfall while crops are maturing will reduce yields.

This soil is moderately suited to deep-rooted pasture and hay plants, such as alfalfa and bermudagrass, and optimum yields are produced when rainfall is adequate.

Plant growth is limited by inadequate rainfall, and forage yields are reduced by dry weather. Grazing or cutting forage crops too close or too often, especially when plants are under moisture stress, will cause stands to die out. Grasses or legumes are difficult to establish because of droughtiness. The best time to plant pasture plants is in the spring when rainfall is adequate for seeds to sprout and for seedlings to become established.

This soil is moderately suited to the production of trees. Wooded areas vary in size and shape and are throughout the Mississippi River flood plain. Eastern cottonwood, black willow, and American sycamore are the dominant trees in areas of the more recently deposited soil. Older stands also include sugarberry, elm, and pecan trees. The sandy texture is a limitation that affects the use of some equipment in woodland management and the harvesting of timber. Planting at times that will allow seedlings to become established before flooding or droughty conditions occur will help overcome the seedling mortality problems. Competing vegetation should be controlled around seedlings until they become established.

Flooding is a severe hazard on building sites. Corrective measures to control flooding generally are not practical because of the high cost and some risk of damage to the property after the measures are applied.

Flooding is a severe hazard on sites for septic tank absorption fields. Contamination of ground water is a danger because of the poor filtering capacity of this sandy soil. Alternate sites should be selected.

Flooding is a severe hazard on sites for roads and streets. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Bruno soil is in capability subclass IVs.

Bs—Bruno silty clay loam, overwash, occasionally flooded. This soil is deep, nearly level to undulating, and excessively drained. It on the Mississippi River flood plain on old, natural levees that are farther away from the present river channel and are now receiving deposits of heavier textured alluvium. This soil is subject to flooding, mainly from February through April. Flooding duration generally is only for several days, but severe flooding can inundate the areas for a longer period, depending on the position of the soil on the landscape. The mapped areas range from 15 to 250 acres. The slopes are short and irregular in shape, and some areas are cut-up and hummocky. The slopes range from 0 to 5 percent.

Typically, this soil has a surface layer of dark grayish brown silty clay loam about 9 inches thick. The underlying material to a depth of 60 inches is stratified layers of brown and pale brown loamy fine sand, very fine sandy loam, and loamy sand.

Included with this soil in mapping are some intermingled areas of soils that have a clay surface layer and some areas that have a loam or a coarser textured surface layer than Bruno soil. Also included, mostly in lower positions on the landscape than Bruno soil, are some soils that have thick strata of silt loam or silty clay loam in the underlying material.

The permeability of this soil is moderate in the surface layer and rapid in the underlying material. The available water capacity is low. The natural fertility is medium. The soil reaction ranges from medium acid to mildly alkaline. Surface runoff is slow or medium, and the hazard of erosion is slight in sloping areas. This soil has poor tilth because of the heavy textured surface layer. The rooting depth generally is not limited.

Most of the acreage of this soil is used as woodland or cropland. A few areas are in pasture. Some areas that are used as cropland are isolated areas in larger fields and are too small to be managed separately.

The low available water capacity of this Bruno soil is the main limitation affecting crop production, and flooding is a hazard. Crops, such as corn and soybeans, generally are not practical because of droughtiness. Irrigation of this soil is moderately effective but will not work well if the surface layer is thin because rapid infiltration and percolation result in water loss. The soil reaction is favorable to most crops, and lime generally is not needed. The heavy textured surface layer of this soil is high in natural fertility and holds added fertilizer elements well. Once they are leached from the surface layer, plant nutrients move quickly through the sandy underlying material. This soil is moderately suited to drought-tolerant crops, such as sunflowers, grain sorghum, or watermelons, but even these crops will not produce well in years of extreme dryness. Preparing a seedbed is difficult because of the poor tilth of the heavy textured surface layer, and poor stands of seedlings can result. However, once the seedlings have emerged, they will become established and for a while will grow better in this soil than in Bruno loamy fine sand because the available water capacity in the surface layer of this Bruno soil is higher. Once the moisture in the surface layer of this soil is exhausted, it is as droughty as Bruno loamy fine sand. Small grain yields are moderate in some years. Flooding in the winter and spring can damage small grain crops, and inadequate rainfall while crops are maturing will sometimes reduce yields. Poor stands often result from poor tilth and the droughty conditions at planting time.

This soil is moderately suited to deep-rooted crops, such as alfalfa and bermudagrass, and optimum yields can be obtained if rainfall is adequate. Plant growth is limited because of inadequate rainfall, and forage yields are reduced because of dry weather conditions. Grazing or cutting forage crops too close when plants are under moisture stress will cause the stands to die. Grasses or legumes are often difficult to establish because of poor tilth and droughtiness. Conditions for establishing pastures are often best in the spring when rain is more abundant.

This soil is moderately suited to the production of trees. Eastern cottonwood, boxelder, sugarberry, silver maple, American elm, and black willow are the dominant trees in the wooded areas. Droughtiness is the main limitation. Seedling mortality is a problem because of flooding and droughtiness. Planting seedlings in sufficient numbers and at the optimum time of the year will help overcome this problem. Controlling competing vegetation around seedlings of desirable trees will allow them to become established and will increase their rate of growth.

Flooding is a severe hazard on building sites. Corrective measures to control flooding generally are not practical because of the high cost and some risk of damage to the property after the measures are applied.

Flooding is a severe hazard on sites for septic tank absorption fields. Contamination of ground water is a danger because of the poor filtering capacity of this soil.

Flooding is a severe hazard on sites for roads and streets. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Bruno soil is in capability subclass IVs.

Ca—Calloway silt loam. This soil is deep, nearly level, and somewhat poorly drained. It is on the loess uplands and broad, loess-covered terraces adjacent to the flood plains of major streams. This soil has a dense, slowly permeable fragipan at a depth of 22 to 30 inches. The mapped areas range from 5 to 90 acres. The slopes are long and smooth to slightly concave and range from 0 to 2 percent.

Typically, this soil has a surface layer of dark brown silt loam about 7 inches thick. The upper part of the subsoil, to a depth of 19 inches, is yellowish brown and light yellowish brown silt loam mottled in shades of gray and brown. Below that layer, to a depth of 27 inches, is an elluvial layer of light gray silt loam. The lower part of the subsoil to a depth of 62 inches is a dense, slowly permeable fragipan of silt loam that is mottled in shades of brown and gray.

Included with this soil in mapping are a few areas of Grenada, Routon, and Center soils. Grenada soils are in higher, more sloping positions on the landscape than Calloway soil and are moderately well drained. Routon soils do not have a fragipan, are in depressional areas, and are poorly drained. Center soils are in similar positions as Calloway soil but do not have a fragipan. Also included are a few areas of Calloway soils that have slopes of more than 2 percent.

The permeability of this soil is moderate above the fragipan and slow in the fragipan. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction is medium acid to very strongly acid except where lime has been added. Surface runoff is slow, and the hazard of erosion is slight except, in a few more sloping areas, runoff is medium and the hazard of erosion is moderate. This soil has moderately good tilth but can be cloddy if plowed when too wet. A perched water table is above the fragipan in wet periods. Plant roots are restricted to the layers above the fragipan and to the gray seams in the fragipan.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture, and a few areas are used as woodland or for building sites.

This Calloway soil is moderately suited to row crops. Excessive wetness is the main limitation affecting crop production. Planting is delayed and poor stands often result from excessive wetness in the spring. Cotton grows tall and rank and matures late in excessively wet periods. The fragipan in the subsoil causes reduced crop yields in a dry summer, especially in crops, such as corn, that need a high content of moisture in the soil. The best yields of most crops are obtained in years that are not excessively wet or dry. This soil is moderately suited to small grains; however, yields are reduced by excessive wetness in the winter, and maturity is delayed by wetness in the spring. Drainage ditches or waterways will remove water from ponded areas. Subsurface drainage systems do not work well in this soil because of the slow permeability of the fragipan. Erosion is a hazard in some of the more sloping areas, and conservation practices to control erosion are needed in these areas.

This soil is well suited to pasture and hay production. Tall fescue or bermudagrass, in combination with white clover, is commonly grown on this soil. Excessive wetness is the major limitation to forage production. Wetness can kill or weaken stands of pasture grasses in the winter, and forage production will decline significantly during the dry, summer months. Controlling grazing and maintaining the pH and soil fertility at recommended levels will help maintain stands and

produce optimum forage yields. This soil is poorly suited to alfalfa because of wetness and the limited rooting depth.

This soil is moderately suited to the production of trees. It is suited to most trees that are tolerant to some wetness. Wetness and plant competition are moderate concerns in woodland management. Wetness restricts the use of equipment; therefore, operations using heavy equipment are easier to accomplish in dry periods. Controlling competing vegetation around seedlings until they become established and begin to shade surrounding plants will increase the survival rate and rate of growth.

This soil is poorly suited to building sites because of wetness. Installing foundation drains, sealing the foundation, sloping the site, and providing ditches and diversions to carry away excess water will prevent wetness problems. This soil is not suited to buildings with basements. Water will collect despite preventative measures. Construction and excavation operations are difficult in wet weather.

This soil is poorly suited as a site for septic tank absorption fields because of slow percolation and wetness. An alternate site should be selected.

Low strength is the main limitation on sites for local roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength. Drainage ditches will prevent excessive wetness.

This Calloway soil is in capability subclass IIw.

Ce—Center silt loam. This soil is deep, nearly level to undulating, and somewhat poorly drained. It formed in loess. This soil is on benches adjacent to the flood plains of major streams and on the loess uplands. The mapped areas vary in shape and range from 5 to 100 acres. The slopes range from 0 to 3 percent.

Typically, this soil has a surface layer of brown silt loam about 8 inches thick. The upper part of the subsoil, to a depth of 36 inches, is yellowish brown silt loam mottled in shades of gray and brown. The lower part, to a depth of 50 inches, is grayish brown silt loam mottled in shades of brown and yellow. The substratum to a depth of 62 inches or more is grayish brown silt loam mottled in shades of brown and yellow.

Included with this soil in mapping are some small areas of Routon soils and a few areas of Calloway and Grenada soils. Routon soils are in depressional areas and are poorly drained. Calloway and Grenada soils are in higher, more sloping positions on the landscape than Center soil and have fragipans. In addition, Grenada soils are moderately well drained. Also included are a few areas of soils that are flooded for brief periods from runoff of adjacent slopes.

The permeability of this soil is moderately slow. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction ranges from strongly acid to slightly acid in the surface layer and upper part of the subsoil and from medium acid to neutral in the lower part of the subsoil and substratum. Surface runoff is slow, and the hazard of erosion is slight. This soil has good tilth; however, in some places, the surface is slow to dry out and tillage is delayed because of wetness. A seasonal water table is at a depth of 1 to 2.5 feet during wet periods in the winter and spring. The rooting depth generally is not limited during the growing season, but the seasonal high water table can limit root growth of some perennial plants in wet periods.

Most areas of this soil have been cleared and are used for cultivated crops. A few small isolated areas are used as pasture or woodland.

This Center soil is well suited to soybeans, corn, and other crops that are tolerant to some wetness, and it is moderately suited to cotton. In some years when the spring is cold and wet, it is difficult to get a good early stand. If summers are excessively wet, cotton will grow tall and rank, harvesting will be delayed, and poor yields will result. Planting rows on high ridges or beds will help this soil to dry out and warm up faster in the spring. This soil is moderately suited to small grains, but the crop can be damaged in the low places because of wetness and ponding in the winter and spring. Drainage ditches and land leveling will reduce ponding and wetness.

This soil is well suited to pasture and hay production. Tall fescue or bermudagrass, in combination with white clover, grows well on this soil. Controlling grazing and maintaining the pH and soil fertility at proper levels will keep pasture productivity high. This soil is poorly suited to alfalfa because of wetness.

This soil is well suited to timber production. The few small areas now in woodland consist of isolated woodlots that are dominated by sweetgum, American elm, and various oaks. Controlling competing vegetation will increase the rate of seedling survival and the rate of growth. Compaction is a moderate limitation that affects the use of conventional equipment on this soil.

This soil is poorly suited to residential, commercial, or industrial building sites because of excessive wetness. Installing a drainage system, raising the site with fill material, and shaping or sloping the site will help overcome the wetness problem.

This soil is poorly suited as a site for septic tank absorption fields because of wetness and slow percolation. An alternate site should be selected.

This soil is poorly suited as sites for roads and streets because of low strength, and wetness is a moderate limitation. The use of a coarse-grained subgrade or base material will prevent cracking and buckling, which are caused by low soil strength. Constructing roads and streets on raised fill material and providing an adequate drainage system will help overcome the wetness limitation.

This Center soil is in capability subclass IIw.

Cm—Commerce silt loam, occasionally flooded. This soil is deep, nearly level, and somewhat poorly drained. It is on the back slopes of natural levees on the Mississippi River flood plain. This soil is subject to flooding, mostly from February through April. Flooding duration generally is only a few days, but severe flooding can inundate the area for several weeks. The mapped areas range from 5 to 700 acres. The slopes are mostly long and smooth. A few areas have short irregular slopes. The slopes are 0 to 2 percent.

Typically, this soil has a surface layer of very dark grayish brown and dark grayish brown silt loam about 11 inches thick. The subsoil, to a depth of 28 inches, is dark grayish brown silty clay loam. The substratum to a depth of 62 inches is grayish brown and dark grayish brown silt loam and silty clay loam. The subsoil and substratum are mottled in shades of brown and gray.

Included with this soil in mapping are some areas of a soil that has a subsoil that is more brown than that of Commerce soil. This soil is moderately well drained. Also included are some areas of soils that have a loam or silty clay loam surface layer and some areas of soils that have a clayey or sandy layer in the subsoil.

The permeability of this soil is moderately slow. The available water capacity is high. The content of organic matter is moderate, and the natural fertility is high. The soil reaction is slightly acid to mildly alkaline. Surface runoff is slow, and erosion is not a hazard. This soil has good tilth, and a good seedbed can be prepared if the soil is worked under favorable moisture conditions. A seasonal high water table is at a depth of 1.5 to 4 feet during periods of high water in the winter and spring. The rooting depth generally is not limited. This soil has a moderate shrink-swell potential.

In most areas, this soil is used for row crops. A few areas, which are mostly in the Anderson-Tully Wildlife Management Area, are in woodland.

This Commerce soil is well suited to a variety of row crops, and maximum yields can be expected in most years. Because of flooding and wetness in the spring, planting is delayed in some years and yields of cotton and corn are reduced. This soil is more suited to soybeans and grain sorghum crops that can be planted later in the growing season than cotton and corn. This soil is naturally high in phosphorus and potassium, and soil reaction is slightly acid to mildly alkaline; therefore, good yields of some crops can be obtained without the addition of fertilizer or lime. Additional nitrogen is needed by nonlegume crops, such as corn, cotton, small grains, and summer annual grasses. Soil tests should be used periodically to determine precise fertilizer requirements. Drainage ditches will remove ponded water from depressional areas. Subsurface drainage systems in this soil are not reliable because flooding backs water into pipes and prevents drainage. Also, this soil has moderately slow permeability. This soil generally is not well suited to small grains because of the possibility of flooding in the winter and spring. Small grains planted at a higher elevation produce well in most years; however, in some years, they have been completely destroyed because of flooding.

This soil is moderately suited to pasture and hay production. The few areas used for pasture are planted to bermudagrass or fescue in combination with white clover. These pasture grasses grow well; however, growth can be delayed in the spring because of wetness, and pasture plants can be damaged because of flooding. This soil produces optimum yields of alfalfa when the soil is not too wet, but stands do not last long because of wetness and flooding.

This soil is well suited to the production of trees. Most woodland areas are in the Anderson-Tully Wildlife Management Area. This soil is well suited to most trees that are tolerant to seasonal wetness, and high yields of timber can be produced. American elm, sugarberry, pecan, American sycamore, and eastern cottonwood are the dominant trees in the wooded areas. Seasonal wetness and flooding moderately restrict the the use of equipment in managing and harvesting timber; therefore, operations using heavy equipment are easier to accomplish in dry periods. Plant competition must be controlled around seedlings.

Flooding is a severe hazard on building sites. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

This soil is poorly suited as a site for septic tank absorption fields because of flooding, wetness, and slow percolation.

Because of low strength and flooding, this soil is poorly suited as sites for roads and streets. The use of

a coarse-grained subgrade or base material will prevent cracking and buckling, which are caused by low soil strength. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Commerce soil is in capability subclass IIIw.

Co—Commerce silty clay loam, occasionally flooded. This soil is deep, nearly level, and somewhat poorly drained. It is on the lower back slopes on natural levees on the Mississippi River flood plain and is subject to flooding, mostly from February through April. Flooding frequency and duration vary with elevation. Flooding duration generally is only a few days, but severe flooding can inundate the areas for a few weeks. The mapped areas range from 5 to 475 acres. The slopes are mostly long and smooth. A few places around old stream channels in wooded areas have shorter, steeper slopes and depressions. The slopes are dominantly 0 to 2 percent.

Typically, this soil has a surface layer of very dark grayish brown silty clay loam about 7 inches thick. The subsoil, to a depth of 32 inches, is dark grayish brown silty clay loam and silt loam that has mottles in shades of brown and gray. The substratum to a depth of 62 inches is grayish brown and dark grayish brown silt loam, loam, and silty clay loam mottled in shades of brown and gray.

Included with this soil in mapping are a few areas of a soil that is in a higher position on the landscape than Commerce soil. It has a brown subsoil and is moderately well drained. Also included are a few intermingled areas of soils that have a clayey layer in the subsoil.

The permeability of this soil is moderately slow. The available water capacity is high. The content of organic matter is moderate, and the natural fertility is high. The soil reaction is slightly acid to mildly alkaline. Surface runoff is slow, and erosion is not a hazard. This soil does not have good tilth, and a good seedbed is difficult to prepare. A seasonal high water table is at a depth of 1.5 to 4 feet, depending on the water level in the river in the winter and spring. The rooting depth generally is not restricted, but a prolonged high water table can limit root growth of some plants. This soil has a moderate shrink-swell potential.

In most areas, this soil is used for row crops. Some areas, which are mostly in the Anderson-Tully Wildlife Management Area, are in woodland.

This Commerce soil is well suited to a variety of row crops, and maximum yields can be expected in most years. Because of flooding and wetness in the spring, planting is delayed in some years and yields of cotton and corn are reduced. This soil is well suited to soybeans and other crops that can be planted later in the growing season, and crop yields generally are high. This soil is naturally high in phosphorus and potassium, and soil reaction is slightly acid to mildly alkaline; therefore, good yields of some crops can be obtained without the addition of fertilizer or lime. Additional nitrogen generally is needed by nonlegume crops, such as corn, cotton, small grains, and summer annual grasses. Soil tests should be used periodically to determine the fertilizer requirements. Because of the heavy surface texture, this soil has poor tilth, which results in poor seedling emergence. Drainage ditches remove excess water from ponded depressional areas. Subsurface drainage systems are not reliable because flooding backs water into pipes and prevents drainage. This soil has moderately slow permeability because of texture. This soil is not well suited to small grains because of the possibility of flooding in the winter and spring. Small grains planted at a higher elevation produce well in most years; however, in some years the entire crop has been destroyed because of flooding.

This soil is moderately suited to pasture and hay production. The few areas used for pasture are planted to bermudagrass or fescue in combination with white clover. These pasture grasses grow well, although growth can be delayed in the spring because of wetness, and pasture plants can be damaged because of flooding. This soil produces good yields of alfalfa when the soil is not too wet, but stands do not last long because of wetness and flooding.

This soil is well suited to the production of trees. Most woodland areas are in the Anderson-Tully Wildlife Management Area. This soil is well suited to most hardwood trees that are tolerant to seasonal wetness, and high yields of timber can be produced American elm, sugarberry, pecan, American sycamore, and eastern cottonwood are the dominant trees in the wooded areas. Seasonal wetness and flooding moderately restrict the use of equipment in managing and harvesting timber; therefore, operations using heavy equipment are easier to accomplish in dry periods. Plant competition must be controlled around seedlings.

Flooding is a severe hazard on building sites. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

This soil is not suited to septic tank absorption fields because of flooding, wetness, and slow percolation.

Because of low strength and flooding, this soil is

poorly suited to sites for roads and streets. The use of a coarse-grained subgrade or base material will prevent cracking and buckling, which are caused by low soil strength. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Commerce soil is in capability subclass IIIw.

Cs—Commerce silt loam, frequently flooded. This soil is deep, nearly level, and somewhat poorly drained. It is in low areas adjacent to the Mississippi River. The slopes gradually grade into the river. Most areas of this soil are flooded at least once a year and are inundated for several weeks. The soil is wet long into the summer because of the high water table. The long, narrow, depressional areas in this map unit are ponded for months. The mapped areas range from 10 to 1,500 acres. The slopes are dominantly 0 to 2 percent.

These are very young soils on which the Mississippi River is still actively building more soil in some places and removing large slices in other places. Deposits of new alluvium, as much as 6 inches thick, have been observed after a flood of long duration, while several feet of river bank have been cut away in other places. Because of the rapid rate of deposition and the variable texture of the new alluvium, the surface texture of this soil is subject to change. The surface texture is silt loam or silty clay loam on most of the acreage in this map unit, but areas of each texture are intermingled and unpredictably grade into each other.

Typically, this soil has a surface layer of dark brown silt loam about 3 inches thick. The subsoil, to a depth of 32 inches, is dark grayish brown silty clay loam and silt loam that has mottles in shades of gray and brown. The substratum to a depth of 62 inches is grayish brown silt loam, loam, and silty clay loam that has brown and gray mottles.

Included with this soil in mapping are some intermingled areas of soils that have layers of clay, sand, or loamy sand in the subsoil or substratum. Also included are a few intermingled areas of soils that have a subsoil that is more brown or gray than Commerce soil.

The permeability of this soil is moderately slow. The available water capacity is high. The content of organic matter is moderate, and the natural fertility is high. The soil reaction is slightly acid to mildly alkaline. Surface runoff is slow, and erosion is not a hazard. A seasonal high water table is at a depth of 1.5 to 4 feet during much of the year, depending on the water level in the river. The rooting depth of all but a few very water-tolerant plants is severely limited because of wetness and the high water table. This soil has a moderate shrink-swell potential.

Almost all of the acreage of this soil is used as woodland.

This Commerce soil is poorly suited to crops and pasture because of wetness and flooding. In many areas, this soil remains flooded well into the summer and is so slow to dry out after the water recedes that the effective growing season is not even long enough for soybeans. Pastures are likely to be flooded or covered with silt in the winter and spring.

This soil is moderately suited to woodland because of frequent flooding and a fluctuating water table. Eastern cottonwood and black willow are the dominant trees in the wooded areas. Some river birch, sweetgum, silver maple, and boxelder are scattered throughout these areas. Trees adapted to this soil grow rapidly. Management and harvesting operations are severely restricted because of frequent flooding, a fluctuating water table, and ponding in some areas. Heavy equipment can only be used during dry periods. Seedling mortality is a severe problem because of flooding.

This soil is not suited to building sites because of flooding and wetness and bank erosion. Measures required to overcome these problems would be economically impractical.

This soil is not suited to septic tank absorption fields because of flooding, slow percolation, and the high water table.

This soil is poorly suited as sites for roads and streets because of flooding, wetness, low strength, and bank erosion. Measures required to overcome these problems would probably require special onsite engineering adaptations and would be extremely expensive.

This Commerce soil is in capability subclass Vw.

Ct—Convent silt loam, occasionally flooded. This soil is deep, nearly level, and somewhat poorly drained. It is in low areas and depressions on the flood plains of streams that drain the loess uplands. Most areas of this soil are subject to occasional flooding in the winter and spring. Flooding is mostly of brief duration, especially on small flood plains. Areas of this soil on the Forked Deer River flood plain and other larger flood plains are inundated for longer periods. Many areas are soggy or ponded for several days after the floodwater recedes. The mapped areas vary in shape and range from 5 to 325 acres. The slopes range from 0 to 2 percent.

Typically, this soil has a surface layer of brown silt loam about 7 inches thick. The underlying material to a

depth of 72 inches is grayish brown and dark grayish brown silt loam that has few to many mottles in shades of brown, gray, and yellow.

Included with this soil in mapping are a few intermingled areas of Arkabutla, Adler, and Rosebloom soils. Arkabutla soils are more acid and have more clay in the underlying material than Convent soil. Adler soils are in slightly higher positions than Convent soil and are moderately well drained. Rosebloom soils are in lower positions in wetter areas and are poorly drained. Also included are some areas of soils below flood control dams in the Cane Creek watershed that are rarely flooded.

The permeability of this soil is moderate. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium to high. The soil reaction ranges from medium acid to neutral in the surface layer and from slightly acid to neutral in the underlying material. Surface runoff is slow, and erosion is not a hazard. This soil has good tilth and can be worked throughout a fairly wide range of moisture content. The water table is within 1.5 to 3 feet of the surface during the winter and spring. The rooting depth is not limited during the growing season. The seasonal high water table can affect the root growth of some perennial plants during the winter and spring.

Most of the acreage of this soil has been cleared and used for row crops. Some areas are in woodland, and a few areas are used for pasture.

This Convent soil is moderately suited to many row crops. In years when flooding and wetness are not a problem and if proper management practices are used, high yields can be obtained. This soil responds well to fertilizer. Soil test recommendations for the use of fertilizer and lime should be followed for maximum yields. This soil dries out and also warms up slowly in the spring, which delays planting and can result in poor stands. In years of excessive wetness, this soil is not suited to crops, such as cotton and corn, which must be planted early. Cotton grows rank and matures late if the summer is excessively wet, especially when excessive nitrogen fertilizer is used. Wetness is a severe limitation affecting small grain crops, and flooding is a severe hazard in the winter. This soil is suited to small grains only in areas where water does not stand for extended periods. Even in these areas, this soil is only marginally suited to this crop. Subsurface drainage can be helpful in areas that have suitable drainage outlets. Land leveling and open ditches will remove water from low depressional areas.

This soil is moderately suited to pasture and hay. Bermudagrass is the most widely used pasture grass; however, even it can be damaged by flooding in low areas, and growth can be delayed in the spring because of wetness. This soil is well suited to summer annual grasses and produces good forage, but it is poorly suited to alfalfa.

This soil is well suited to tree production. Most trees that are tolerant to wetness and flooding will grow well. Eastern cottonwood, American sycamore, sweetgum, wetland oaks, and black willow are the dominant trees in the wooded areas. The use of heavy equipment in managing and harvesting timber is limited during wet periods.

Wetness is a severe limitation on building sites, and flooding is a severe hazard. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

Because of flooding and wetness, this soil is not suited to sites for septic tank absorption fields.

This soil is poorly suited as sites for roads and streets because of flooding. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Convent soil is in capability subclass IIIw.

Cv—Crevasse loamy sand, occasionally flooded. This soil is deep, nearly level to undulating, and excessively drained. It formed in sandy alluvium on the flood plains of the Mississippi River and is subject to flooding, mainly from February through April. Flooding generally is of short duration, especially in high areas; however, severe flooding can inundate some areas for weeks. This soil is mostly on natural levees adjacent to the Mississippi River, but a few areas are sandbars in the river channel. Areas of this soil are subject to alteration by flooding. Areas near the river bank can be completely removed or covered with several feet of sandy material by severe flooding. The mapped areas range from 5 to 550 acres. The slopes are irregular in shape and vary in length and range from 0 to 5 percent.

Typically, this soil has a surface layer of yellowish brown loamy sand about 7 inches thick. The upper part of the underlying material, to a depth of 20 inches, is light yellowish brown sand. The lower part to a depth of 65 inches is pale brown fine sand.

Included with this soil in mapping are a few intermingled areas of Bruno, Robinsonville, and Commerce soils. Bruno soils have loamy textured strata. Robinsonville soils are loamy textured and are well drained. Commerce soils are in low depressional areas, have a finer texture, and are somewhat poorly drained.

The permeability of this soil is rapid. The available water capacity is very low. The content of organic matter is low, and the natural fertility is medium. The soil reaction ranges from medium acid to mildly alkaline. Surface runoff is slow, and the hazard of erosion is not significant. This soil has good tilth and can be worked throughout a wide range of moisture content. A water table is at a depth of 4 to 6 feet, depending on the water level in the river from December through April. The rooting depth generally is not limited.

Most of the acreage of this soil has been cleared and is used for pasture, hay, small grains, or row crops. Many areas are in woodland. Some recently deposited areas are bare, or have scattered small trees and shrubs.

This Crevasse soil is poorly suited to row crops because of droughtiness, and flooding is a hazard that also affects crop production. Irrigation is not effective on this soil because water moves through it rapidly and very little moisture is retained for plant use. The ability of this soil to hold plant nutrients is low. Fertilizer, especially nitrogen fertilizer, is leached out rapidly. Small grains are grown in a few areas, but poor yields are common because of flooding. A good stand is difficult to establish because of dry conditions in the fall.

Droughtiness is the main limitation affecting pasture and hay production, and flooding is a hazard. Sand deposited by the floodwaters can cover parts of established pastures. This soil will produce moderate yields of forage in the spring when moisture is abundant if stands can be established and maintained. This soil is better suited to common or improved bermudagrass. Fescue and many legumes are not tolerant to droughty conditions and flooding. This soil will produce moderate yields of alfalfa in the spring, but this crop is difficult to establish and maintain.

This soil is moderately suited to the production of trees. Wooded areas vary in size and shape and are scattered throughout the Mississippi River flood plains. Black willow, eastern cottonwood, and American sycamore are the dominant trees in most wooded areas. The older stands also include sugarberry and American elm. Seedling mortality is a severe concern in managing this droughty soil as woodland. If seedlings do not establish a deep root system before hot, dry weather in the summer, they will die. Planting seedlings late in the winter will give them the best chance for survival. The use of heavy equipment is restricted because of flooding in the winter and spring; therefore, operations involving heavy equipment are easier to accomplish in the summer and fall. Maintaining good stands of trees along river banks will help slow river bank erosion.

Flooding is a severe hazard on building sites. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

Flooding is a severe hazard on sites for septic tank absorption fields. Contamination of ground water is a danger because of the poor filtering capacity of this sandy textured soil.

Flooding is a severe hazard on sites for local roads and streets. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

The Crevasse soil is in capability subclass VIs.

De—Dekoven silt loam, overwash, rarely flooded. This soil is deep, nearly level, and poorly drained. It has a very dark surface layer overlain by overwash material from the steep uplands. This soil is on benches adjacent to the flood plains of major streams and is rarely flooded during periods of extremely heavy rainfall. It is flooded for brief periods by runoff from nearby loess uplands. The mapped areas vary in shape and range from 5 to 50 acres. The slopes range from 0 to 2 percent.

Typically, this soil has a surface layer of brown silt loam overwash 10 inches thick. The upper part of the old buried surface layer, to a depth of 21 inches, is very dark gray silt loam. The lower part, to a depth of 30 inches, is black silt loam. The upper part of the subsoil, to a depth of 42 inches, is dark gray silt loam that has mottles in shades of yellow and gray. The lower part to a depth of 72 inches is light brownish gray silt loam.

Included with this soil in mapping are a few areas of Center soils and a few intermingled areas of Routon soils. Center soils are in higher positions on the landscape than Dekoven soil, the layers are not as dark, and these soils are somewhat poorly drained. Routon soils do not have the very dark layers that are typical of Dekoven soil.

The permeability of this soil is moderate. The available water capacity is high. The content of organic matter is high, and the natural fertility is medium. The soil reaction is slightly acid to mildly alkaline. Surface runoff is very slow, and erosion is not a hazard. This soil has good tilth; however, the surface layer is slow to dry out and tillage can be delayed because of wetness. A seasonal water table is at a depth of less than a foot sometimes during the winter and spring. The rooting depth generally is not limited during the growing

season. The seasonal water table restricts root growth of perennial plants in wet periods.

In most areas, this soil is used for cultivated crops. A few small, scattered areas are used as pasture or woodland.

This Dekoven soil is moderately suited to cultivated crops that are tolerant to wetness. Wetness is the main limitation affecting crop production. This soil is slow to dry out in the spring, which delays tillage and planting in some years. Poor stands often result because of cold, wet conditions in the early spring. In wet years, this soil is poorly suited to crops, such as cotton and corn, which must be planted early in the growing season. In addition, excessive wetness during the growing season can cause cotton to grow excessively tall and rank, which results in a delayed harvest and poor yields. Planting on high ridges or beds will help this soil dry out and warm up faster in the spring. This soil is moderately suited to small grains, but this crop is damaged in some areas because of wetness, ponding, or flooding in the winter and spring. Drainage ditches and land leveling will reduce ponding and wetness.

This soil is moderately suited to pasture and hay production. Tall fescue or bermudagrass, in combination with white clover, is commonly grown on this soil. Installing a drainage system, controlled grazing, and maintaining the pH and soil fertility at the proper levels will maintain pasture productivity. This soil is poorly suited to alfalfa.

This soil is well suited to timber production. The few small areas now in woodland consist of isolated woodlots that are dominated by willow oak, wetland oaks, sweetgum, and eastern cottonwood. Wetness restricts the use of equipment in managing and harvesting timber; therefore, operations involving heavy equipment are easier to accomplish in the summer and fall. Seedling mortality is a moderate problem because of wetness. Plant competition is a concern in woodland management. Controlling competing vegetation around young stands will help seedlings to survive and increase their rate of growth.

Wetness is a severe limitation on residential, commercial, and industrial building sites, and flooding is a severe hazard. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

This soil is poorly suited as sites for septic tank absorption fields because of flooding and wetness.

This soil is poorly suited as sites for roads and streets because of wetness, flooding, and low strength. The use of a coarse-grained subgrade or base material will prevent cracking and buckling, which are caused by low soil strength. Raising of the roadbed will help control flooding.

This Dekoven soil is in capability subclass IIIw.

Du—Dubbs silt loam, occasionally flooded. This soil is deep, nearly level to gently sloping, and well drained. It is on low terraces on the Mississippi River flood plain near the Forked Deer River and on low terraces adjacent to the Hatchie River flood plain. This soil is subject to flooding by the Mississippi or Hatchie Rivers. The mapped areas range from 5 to 50 acres. The slopes generally are long and smooth but are shorter and steeper where terraces join the flood plains. They range from 0 to 4 percent.

Typically, this soil has a surface layer of dark brown silt loam about 5 inches thick. The subsoil, to a depth of 50 inches, is strong brown, dark yellowish brown, and yellowish brown silt loam and loam. The substratum to a depth of 64 inches is dark yellowish brown very fine sandy loam.

Included with this soil in mapping are a few small areas of Askew soils that are are in depressions and are moderately well drained. Also included are a few intermingled areas of soils that have a sandier texture than Dubbs soil, some soils in higher positions than Dubbs soil and that are rarely flooded, and a few areas of soils that are more frequently flooded than Dubbs soil.

The permeability of this soil is moderate. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction ranges from very strongly acid to medium acid. Surface runoff is slow on the gently sloping soil and is medium on the steeper sloping soil. The hazard of erosion is slight on the soils that have steeper slopes. This soil has good tilth, and a good seedbed can be prepared if moisture conditions are favorable. A water table is at a depth of 4 to 6 feet, depending on the water level in the river. The rooting depth generally is not limited.

Most of the acreage of this soil has been cleared and is used for row crops and small grains. A few areas are in woodland.

This Dubbs soil is well suited to row crops and small grains. Flooding is a hazard affecting crop production; however, optimum yields can be obtained if proper management practices are used and flooding is not a problem. This soil responds well to fertilizer and lime. Soil tests should be used to determine fertilizer and lime requirements. Flooding delays planting in some years, and cotton or corn cannot be planted early

enough to produce good yields. Good wheat yields are obtainable in some years, but wheat crops can be damaged by flooding, especially in the low areas.

This soil is well suited to pasture and hay production. Common or improved bermudagrass is a good permanent pasture grass. Fescue pastures can be damaged by flooding. This soil is well suited to summer annual grasses and produces optimum yields. It will produce good yields of alfalfa when the soil is not too wet, but it is not well suited to alfalfa because of flooding.

This soil is well suited to the production of trees. Woodland areas consist of a few scattered plots. Various oaks and hickories are the dominant trees in the wooded areas. Plant competition is a moderate concern in woodland use and management. Controlling competing vegetation around seedlings will allow them to become established and increase their rate of growth.

Flooding is a severe hazard on building sites. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

Flooding is a severe hazard on sites for septic tank absorption fields.

Flooding is a severe hazard on sites for roads and streets. Raising the roadbed to help control flooding can be a practical solution to the problem in some places.

This Dubbs soil is in capability subclass IIw.

Dv—Dundee silty clay loam, overwash, occasionally flooded. This soil is deep, nearly level, and somewhat poorly drained. It is in flat areas on the Mississippi River flood plain and, from February through April, is subject to flooding by the Mississippi and Forked Deer Rivers. Flooding duration generally is only a few days, but severe flooding can inundate the lower areas for a few weeks. The slopes are long and smooth. The mapped areas range from 10 to 200 acres. The slopes range from 0 to 2 percent.

Typically, this soil has a surface layer of very dark grayish brown silty clay loam about 6 inches thick. The overwash material below the surface layer, to a depth of 13 inches, is dark grayish brown silty clay loam that has mottles in shades of brown. The surface of the buried soil, to a depth of 21 inches, is dark grayish brown silt loam that has mottles in shades of brown. The upper part of the subsoil, to a depth of 33 inches, is dark grayish brown silt loam that has mottles in shades of brown. The lower part to a depth of 60 inches is grayish brown silt loam that has mottles in shades of brown and gray.

Included with this soil in mapping are a few areas of Askew, Dubbs, and Amagon soils. Askew and Dubbs soils are in higher positions on the landscape than Dundee soils. Askew soils are moderately well drained and Dubbs soils are well drained. Amagon soils are in low or depressional areas and are poorly drained.

The permeability of this soil is moderately slow. The available water capacity is high. The content of organic matter is low, and the natural fertility is high in the depositional layers and medium in the underlying soil. The soil reaction is slightly acid to strongly acid in the depositional layers and medium acid to very strongly acid in the buried surface soil. Surface runoff is slow, and erosion is not a hazard. This soil does not have good tilth and a good seedbed can be difficult to prepare; however, tilth is better in this soil than it is in Dundee silty clay, overwash, occasionally flooded. An apparent high water table is at a depth of 1.5 to 3 feet sometimes during the winter and spring. The rooting depth generally is not limited during the growing season, but the high water table can limit root growth of some perennial plants during extended wet periods. The shrink-swell potential is moderate in the depositional material layers and low in the underlying layers.

Most of the acreage of this soil has been cleared and is used for row crops. A few areas remain in woodland.

This Dundee soil is moderately suited to row crops, such as soybeans, that are tolerant to wetness and do not require early planting. Maximum yields can be expected in favorable years if proper management practices are used. Crops respond well to periodic applications of fertilizer and lime. Soil tests should be used to determine fertilizer and lime requirements. This soil is poorly suited to crops, such as cotton and corn, because flooding and wetness in the spring delay planting and result in poor stands. This soil is poorly suited to small grains because of the hazard of flooding in the winter and spring. Drainage ditches and land leveling will remove standing water and help prevent ponding in low places. Subsurface drainage is less effective because of flooding. This soil is susceptible to the formation of a plowpan, and the silty clay loam surface layer causes difficulty in tilling and problems in seedling emergence.

This soil is moderately suited to perennial pasture grasses, but they can be damaged by flooding or standing water. This soil is well suited to summer annual grasses or forage crops that are tolerant to wetness. It is poorly suited to alfalfa because of flooding and wetness.

This soil is moderately suited to hardwood trees that are tolerant to wetness and flooding. Woodland areas

vary in size. White ash, sweetgum, American elm, and various oaks are the dominant trees in the wooded areas. Wetness and flooding restrict the use of equipment in managing or harvesting timber; therefore, operations involving heavy equipment are easier to accomplish in the summer and fall. Plant competition is a moderate concern in woodland management. Controlling competing vegetation around seedlings will help them become established and grow faster. Seedling mortality is a moderate concern because of flooding.

Wetness is a severe limitation on building sites, and flooding is a severe hazard. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

This soil is not suited to sites for septic tank absorption fields because of flooding and wetness.

This soil is poorly suited as sites for local roads and streets because of flooding. Raising the roadbed can help control flooding.

This Dundee soil is in capability subclass IIIw.

Dw—Dundee silty clay, overwash, occasionally flooded. This soil is deep, nearly level, and somewhat poorly drained. It is in broad, flat areas on the Mississippi River flood plain. This soil is subject to flooding, generally from February through April. Flooding duration generally is only a few days, but severe flooding can inundate lower areas for a few weeks. The mapped areas range from 10 to 525 acres. The slopes are long and smooth and range from 0 to 2 percent.

Typically, this soil has a surface layer of very dark grayish brown silty clay 6 inches thick. The remainder of the overwash material, to a depth of 17 inches, is dark grayish brown clay that has brownish mottles. The surface of the buried soil, to a depth of 22 inches, is grayish brown silt loam. The upper part of the subsoil, to a depth of 29 inches, is grayish brown silt loam that has brownish mottles. The middle part, to a depth of 57 inches, is light brownish gray silt loam that has brownish mottles. The lower part to a depth of 62 inches is grayish brown loam that has brownish mottles.

Included with this soil in mapping are small areas of Amagon, Askew, and Dubbs soils. Amagon soils are in depressional areas and are poorly drained. Askew and Dubbs soils are in higher positions on the landscape than Dundee soil. Askew soils are moderately well drained, and Dubbs soils are well drained.

The permeability of this soil is moderately slow except in the clayey depositional layers where it is slow. The available water capacity is high. The content of organic matter is low, and the natural fertility is high in the clayey depositional layers and medium in the underlying loamy layers. The soil reaction ranges from slightly acid to strongly acid in the clayey depositional layers and from medium acid to very strongly acid in the buried soil. Surface runoff is slow, and there is no hazard of erosion. This soil has poor tilth, and a seedbed is difficult to prepare. A high water table is at a depth of 1.5 to 3 feet sometimes during the winter and spring. The rooting depth generally is not limited during the growing season, but the high water table can limit root growth of some perennial plants during extended wet periods. The shrink-swell potential is high in the clayey depositional layers and low in the loamy layers.

Most of the acreage of this soil has been cleared and is used for row crops. A few areas remain in woodland.

This Dundee soil is moderately suited to row crops, such as soybeans, that are tolerant to wetness and do not require early planting. Maximum yields can be expected in favorable years if proper management practices are used. Crops respond well to periodic applications of fertilizer and lime. Soil tests should be used to determine fertilizer and lime requirements. This soil is poorly suited to crops, such as cotton and corn, because flooding and wetness in the spring delay planting and result in poor stands. This soil is poorly suited to small grains because of the hazard of flooding in the winter and spring. Drainage ditches and land leveling will remove standing water and help to prevent ponding in low places. Subsurface drainage is less effective because of flooding. The clayey surface layer causes difficulty in tillage and problems in seedling emergence. Also, compacted plowpans, which restrict root growth and water infiltration, tend to form when this soil is tilled over long periods with heavy equipment. Farming and tillage operations involving heavy equipment should be limited or consolidated, especially under wet conditions. The content of organic matter should be kept as high as possible to delay or prevent the formation of a plowpan.

This soil is moderately suited to perennial pasture plants, but these plants can be damaged by flooding or standing water. This soil is well suited to forage crops, which are tolerant to wetness and to summer annual grasses, but it is poorly suited to alfalfa because of flooding and wetness.

This soil is moderately suited to hardwood trees that are tolerant to wetness and flooding. Woodland areas consist of small to moderate-size blocks. Wetland oaks, sweetgum, white ash, and American elm are the dominant trees in the wooded areas. Wetness and

flooding restrict the use of equipment in managing and harvesting timber; therefore, operations involving heavy equipment are easier to accomplish in the summer and fall. Seedling mortality is a severe problem because of the clayey surface layer. Plant competition is a moderate concern in woodland management. Controlling competing vegetation around seedlings will help them become established and increase their rate of growth.

Wetness is a severe limitation on building sites, and flooding is a severe hazard. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

This soil is not suited as a site for septic tank absorption fields because of flooding and wetness. An alternate site should be selected.

This soil is poorly suited as sites for local roads and streets because of flooding. Raising the roadbed will help control flooding.

This Dundee soil is in capability subclass IIIw.

GrB2—Grenada silt loam, 2 to 5 percent slopes, eroded. This soil is deep, gently sloping, and moderately well drained. It is on low, undulating loess uplands and broad, loess-covered terraces adjacent to the flood plains of major streams. This soil has a dense, slowly permeable fragipan at a depth of about 25 inches. The mapped areas range from 5 to 100 acres. The slopes are long and smooth.

Typically, this soil has a surface layer of brown silt loam about 6 inches thick. It includes some of the subsoil because erosion has removed part of the original surface layer. The upper part of the subsoil, to a depth of 20 inches, is dark yellowish brown and yellowish brown silt loam mottled in shades of brown. Below that layer, to a depth of 25 inches, is light gray silt and yellowish brown silt loam. The lower part of the subsoil to a depth of 60 inches has a fragipan that is mottled dark brown, brown, and gray silt loam.

Included with this soil in mapping are some small areas of somewhat poorly drained Calloway soils that are in concave, depressional areas or on the lower foot slopes. Also included are some severely eroded soils that are in steeper, more dissected areas and have a fragipan at a more shallow depth than the Grenada soil.

The permeability of this soil is moderate in the layers above the fragipan and slow in the fragipan. The available water capacity is moderate or high, depending on the depth to the fragipan. The content of organic matter is low, and the natural fertility is medium. The soil reaction is very strongly acid to medium acid except where lime has been added. Surface runoff and the hazard of erosion are moderate. This soil has moderately good tilth unless it is plowed when it is too wet. A perched water table is above the fragipan during wet periods. Plant root growth is severely restricted by the fragipan; therefore, the rooting depth generally corresponds to depth to the fragipan.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture, and a few areas are used as woodland or for residential building sites.

This Grenada soil is suited to a variety of row crops and small grains. Maximum yields can be obtained if proper management practices are used and proper fertility and pH levels are maintained, as recommended by soil tests. Erosion is a moderate hazard. Droughtiness and excessive wetness during winter and spring are limitations that also affect crop production. Terraces, contour farming, and grassed waterways will reduce erosion in cultivated areas. Conservation tillage, winter cover crops, and crop rotation will reduce erosion and increase the content of organic matter, which helps to prevent crusting and improves tilth. Depth to the fragipan and the available water capacity are limitations that can be minimized if proper conservation practices are used and erosion is controlled. This soil is not suited to crops, such as corn, that are susceptible to moisture stress. Perennial crops and small grains can be damaged or planting can be delayed by excessive wetness in the winter and spring, especially in low or ponded areas.

This soil is well suited to hay and pasture production. Tall fescue or bermudagrass, in combination with white clover, is commonly grown on this soil. The limited available water capacity and the erosion hazard slightly limit forage production. Forage production will decline during the dry, summer months. Controlling grazing and maintaining the pH and soil fertility at proper levels will control erosion and maintain productivity of pastures. This soil is poorly suited to alfalfa because of seasonal wetness and the limited available water capacity.

The potential of this soil for production of trees is high. This soil is well suited to most trees commonly grown in the area. Woodland areas consist of small isolated woodlots. Oaks and hickories are the dominant trees in the wooded areas. Plant competition is the most significant concern in woodland use and management.

This soil is moderately suited to most building sites. Wetness is a severe limitation for buildings with basements because of a seasonal perched high water table. Installing foundation drains and sealing foundations will prevent wetness in basements.

This soil is poorly suited as sites for septic tank absorption fields because of the seasonal high water table and slow permeability in the fragipan.

Low strength is the main limitation on sites for roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength.

This Grenada soil is in capability subclass IIe.

GrB3—Grenada silt loam, 2 to 5 percent slopes, severely eroded. This soil is deep, gently sloping, and moderately well drained. It is on side slopes on low, undulating, loess uplands and on broad, loess-covered benches adjacent to the flood plains of major streams. This soil has a dense, slowly permeable fragipan at a depth of about 17 inches. The mapped areas range from 5 to 70 acres. The slopes vary in length and can be smooth and dissected.

Typically, this soil has a surface layer of dark yellowish brown silt loam about 5 inches thick. The upper part of the subsoil, to a depth of 12 inches, is dark yellowish brown silt loam. Below that layer, to a depth of 17 inches, is light brownish gray silt and yellowish brown silt loam. The lower part of the subsoil to a depth of 60 inches is a fragipan that is yellowish brown silt loam that has mottles in shades of brown and gray.

Erosion has removed all of the original surface layer and part of the subsoil in the major part of this map unit. In many small areas, erosion has removed nearly all of the subsoil above the fragipan. Other small areas are less eroded than is described as typical for the series. These areas are too intermingled or too small to map separately or to manage effectively. Some areas include shallow gullies and a few deep gullies; however, most areas are cropland and the gullies are filled when the soil is prepared for seeding.

Included with this soil in mapping are some small areas of Calloway soils that are in concave, depressional areas or on the lower foot slopes. These soils are somewhat poorly drained.

The permeability of this soil is moderate in the material above the fragipan, and it is slow in the fragipan. The available water capacity is moderate. The content of organic matter is low, and the natural fertility is medium. The soil reaction is very strongly acid to medium acid except where lime has been added. Surface runoff and the hazard of erosion are moderate. This soil has moderately good tilth but can be cloddy under some conditions. A perched water table is above the fragipan during wet periods. Plant root growth is severely restricted by the fragipan; therefore, the rooting depth generally corresponds to depth to the fragipan.

Most areas of this soil are used for cultivated crops. Some areas are used as pasture, and a few areas are used as woodland or for residential building sites.

This Grenada soil is moderately suited to crops that can tolerate the low moisture content of the soil, a condition which occurs in most summers. The low moisture content is caused by the shallow rooting depth to the fragipan. This soil is poorly suited to crops, such as corn, that need a high content of moisture in the soil or are susceptible to moisture stress. Moderate yields of soybeans and cotton can be obtained if rainfall is adequate during the growing season. This soil is moderately suited to small grains, but stands can be damaged by dry weather in the fall or by excessive wetness in the winter or spring. Crop production is limited mainly by the low available water capacity and the erosion hazard. The low available water capacity limitation can be minimized if proper conservation practices are used. Terraces, contour plowing, and grassed waterways reduce erosion in cultivated areas. Conservation tillage, winter cover crops, and crop rotation reduce erosion and increase the content of organic matter. Organic matter helps to prevent crusting and improves tilth and water infiltration.

This soil is moderately suited to pasture and hay production. Tall fescue or bermudagrass is commonly grown. This soil will produce optimum yields of forage if rainfall is adequate, but forage yields are reduced significantly during dry weather because of the low available water capacity. Controlling grazing and maintaining the pH and soil fertility at proper levels will help control erosion and sustain productivity. This soil is poorly suited to alfalfa because of the low available water capacity, excessive wetness, and shallow rooting depth.

The potential of this soil for the production of trees is good. This soil is well suited to most trees commonly grown in the area. Plant competition is the most significant concern in woodland use and management.

This soil is moderately suited to building site development. Wetness, caused by a seasonal perched water table, is a severe limitation affecting buildings with basements. Drainage systems are needed if excavation is done during wet weather. Installing foundation drains and sealing foundations will prevent wetness in basements.

Wetness and the slow permeability of the fragipan are severe limitations on sites for septic tank absorption fields.

Low strength is the main limitation on sites for roads

and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength.

This Grenada soil is in capability subclass IIIe.

GrC2—Grenada silt loam, 5 to 8 percent slopes, eroded. This soil is deep, moderately sloping, and moderately well drained. It is on side slopes on low, rolling uplands and on broad, loess-covered benches. This soil has a dense, slowly permeable fragipan at a depth of about 25 inches. The mapped areas range from 5 to 25 acres. The slopes vary in length and can be smooth or dissected.

Typically, this soil has a surface layer of brown silt loam about 6 inches thick. It includes some of the subsoil because erosion has removed part of the original surface layer. The upper part of the subsoil, to a depth of 20 inches, is yellowish brown and dark yellowish brown silt loam that has a few mottles in shades of brown. Below that layer, to a depth of 25 inches, is light gray silt and yellowish brown silt loam. The lower part of the subsoil to a depth of 60 inches is a fragipan that is dark yellowish brown silt loam that has mottles in shades of gray and brown.

Included with this soil in mapping are some areas of severely eroded soils that have a fragipan at a depth less than is described as typical for the series.

The permeability of this soil is moderate in the material above the fragipan and slow in the fragipan. The available water capacity is moderate or high, depending on the depth to the fragipan. The soil reaction is very strongly acid to medium acid except where lime has been added. Surface runoff is rapid, and the hazard of erosion is severe. This soil has moderately good tilth unless it is plowed when it is too wet. A perched water table is above the fragipan during wet periods. Plant root growth is severely restricted by the fragipan; therefore, the rooting depth generally corresponds to depth to the fragipan.

Most areas of this soil are used for cultivated crops or pasture. A small acreage is in woodland or is used for urban development.

This Grenada soil is moderately suited to row crops and small grains. Cropland production is limited mainly by the erosion hazard and restricted rooting depth. Terracing, grassed waterways, and contour plowing will reduce the erosion hazard. Conservation tillage, winter cover crops, and crop rotations will increase the content of organic matter and also reduce erosion. This soil is not suited to continuous row cropping; therefore, pasture or close-grown crops should be used in the crop rotation system. Depth to the fragipan and the available water capacity are limitations that can be minimized if proper conservation practices are used and erosion is controlled. This soil is not well suited to crops, such as corn, that are highly susceptible to moisture stress.

This soil is well suited to pasture and hay production. Tall fescue or bermudagrass, in combination with white clover, is most commonly grown on this soil. Pasture production is limited mainly by the erosion hazard and the limited available water capacity. Maintaining a solid, dense plant cover, controlling grazing, and maintaining the pH and soil fertility at proper levels will help control erosion and sustain productivity. Forage production is reduced in dry periods because of the low available water capacity. This soil is poorly suited to alfalfa because of a restricted root zone.

The potential of this soil for the production of trees is good, although the erosion hazard and plant competition are concerns in woodland use and management. This soil is well suited to most trees commonly grown in the area. Oaks, hickories, and sweetgum are the dominant trees in the wooded areas.

This soil is moderately suited to building site development. Wetness, caused by the seasonal high water table, is a severe limitation affecting buildings with basements. Installing foundation drains and sealing foundations will prevent wetness in basements.

Wetness and the slow permeability of the fragipan are severe limitations on sites for septic tank absorption fields.

Low strength is the main limitation on sites for roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength.

This Grenada soil is in capability subclass IIIe.

GrC3—Grenada silt loam, 5 to 8 percent slopes, severely eroded. This soil is deep, moderately sloping, and moderately well drained. It is on side slopes on low, rolling uplands and on broad, loess-covered benches. This soil has a dense, slowly permeable fragipan at a depth of about 17 inches. The mapped areas range from 5 to 50 acres. The slopes are short and irregular in shape.

Typically, this soil has a surface layer of brown silt loam about 5 inches thick. The upper part of the subsoil, to a depth of 12 inches, is yellowish brown silt loam that has mottles in shades of brown and yellow. Below that layer, to a depth of 17 inches, is light gray

silt and yellowish brown silt loam. The upper part of the subsoil to a depth of 60 inches is a fragipan that is pale brown and light brownish gray silt loam that has mottles in shades of brown.

Erosion has removed all of the original surface layer and part of the subsoil in the major part of this map unit. In many small areas, erosion has removed nearly all of the subsoil above the fragipan. Other small areas are less eroded than is described as typical for the series. These areas are too intermingled or are too small to map separately or manage effectively. Some areas include shallow gullies and a few deep gullies; however, many areas are cropland and the gullies are filled when the soil is prepared for seeding.

Included with this soil in mapping are small areas of Loring soils. These included soils are in higher positions on the landscape than Grenada soil.

The permeability of this soil is moderate in the material above the fragipan and slow in the fragipan. The available water capacity is moderate. The content of organic matter is low, and the natural fertility is medium. The soil reaction is very strongly acid to medium acid except where lime has been added. Surface runoff is rapid, and the hazard of erosion is severe. This soil has moderately good tilth but can be cloddy under some moisture conditions. A perched water table is above the fragipan during wet periods. Plant root growth is severely restricted by the fragipan; therefore, the rooting depth generally corresponds to depth to the fragipan.

Most of the acreage of this soil is used for cultivated crops. Some areas are used for pasture, and a few areas are used as woodland or for residential building sites.

This Grenada soil is moderately suited to crops that can tolerate the low moisture content of the soil, a condition which occurs in most summers. The low moisture content is caused by the shallow rooting depth to the fragipan. This soil is poorly suited to crops, such as corn, that need a high content of moisture in the soil or are susceptible to moisture stress. Moderate yields of soybeans and cotton can be obtained if rainfall is adequate during the growing season. This soil is moderately suited to small grains; however, stands can be damaged by dry weather in the fall. Crop production is limited mainly by the low available water capacity and the severe erosion hazard. The available water capacity limitation can be minimized if proper conservation practices are used. Terraces, contour plowing, and grassed waterways will reduce soil erosion. Conservation tillage, winter cover crops, and crop rotations will increase the content of organic matter. This soil is not suited to continuous row cropping; therefore, pasture or close-grown crops should be used in the crop rotation system.

This soil is moderately suited to pasture and hay production. Tall fescue or bermudagrass, in combination with white clover, is most commonly grown on this soil. Pasture production is limited mainly by the erosion hazard and the limited available water capacity. Maintaining a solid, dense plant cover, controlling grazing, and maintaining the pH level and soil fertility will help control erosion and sustain productivity of pasture grasses. Forage yields are reduced significantly during dry periods because of the low available water capacity. This soil is poorly suited to alfalfa because of a shallow root zone.

The potential of this soil for the production of trees is good, although the erosion hazard and plant competition are concerns in woodland use and management. This soil is suited to most trees commonly grown in the area. Woodland areas consist of small plots of mixed hardwoods.

This soil is moderately suited to building site development. Wetness, caused by a seasonal high water table, is a severe limitation affecting buildings with basements. Installing foundation drains and sealing foundations will prevent wetness in basements.

Slow percolation and wetness are severe limitations on sites for septic tank absorption fields.

Low strength is the main limitation on sites for local roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength.

This Grenada soil is in capability subclass IVe.

Gu—Gullied land-Memphis complex, very steep. This map unit consists mainly of Memphis soil that is deep and extremely eroded. It is in highly dissected areas on the thick loess uplands. Accelerated erosion has formed large, deeply entrenched, highly branched, U-shaped gullies that are as much as 200 feet wide and 75 feet deep. Many of the gullies are actively eroding and expanding as soil material around the edges is undercut and slumps into the bottom. Areas between the gullies are long, narrow fingers of severely eroded Memphis soil. The bottoms of the gullies consist of material that has slumped from the sides. The slopes of the gullied land are highly variable in shape, length, and steepness. The sides of the gullies are very steep to almost vertical. The slopes of the Memphis soil range from about 2 to 12 percent.

Gullied land makes up 75 to 95 percent of this map

Figure 8.—Kudzu protects this area of Gullied land-Memphis complex, very steep, from further erosion, but it can damage trees in an adjacent area.

unit, and severely eroded Memphis soil makes up 5 to 25 percent.

Gullied land is so truncated that all soil layers have been destroyed in most places. Unweathered loess is exposed on most of the sidewalls of the gullies, and the bottoms are a mixture of the loess that is exposed by truncation and the loess that has slumped from the sides of the gullies.

Typically, this Memphis soil has a surface layer of dark yellowish brown silt loam about 6 inches thick. The subsoil, to a depth of about 40 inches, is dark brown silt loam. The substratum to a depth of 60 inches or more is dark brown silt loam.

The permeability of this soil is moderate. The available water capacity is high. The soil reaction is medium acid or strongly acid except where lime has been added. The content of organic matter is low, and the natural fertility is medium. Runoff is very rapid, and the potential for additional erosion is very high. There is no water table within 60 inches of the surface, and rooting depth generally is not limited.

This Memphis soil is not suited to crops and pasture

because of the extreme steepness and instability of the slopes. This soil can not be worked with conventional equipment, and any tillage or disturbance of the soil would likely result in increased erosion. Vegetation can not be grazed in many places, and erosion generally increases if grazing is attempted. In addition, the unstable areas near gullies are dangerous to cattle. Establishing permanent plant cover is the best way to control erosion on this soil; however, this practice often is difficult because of the effort involved in planting seeds or seedlings on the steep, unstable slopes. Diversions or terraces on land above gullied areas will reduce the amount of runoff into gullies in some places. Hairy vetch, serecia lespedeza, and other legumes are suitable but difficult to plant. Kudzu is suitable to plant in many areas and is easy to establish; however, kudzu is difficult to control and often spreads to surrounding areas (fig. 8). Reshaping, grading, or smoothing this land is not practical in most places because of the necessity of moving a large volume of earth.

The soil in this map unit is poorly suited to tree production mainly because of the difficulty in establishing, maintaining, and harvesting timber in the steep, unstable areas. This soil is well suited to loblolly pine and other trees, but planting is difficult because of the steep, unstable landscape. Trees will grow well if they can be established, but some trees can be damaged or killed when slumps carry them into the bottom of the gullies and sediment fills in around them. In some areas, woodland consists of cutover areas of regrowth that is predominantly yellow poplar and various oaks and hickories. Gullies will often expand even in wooded areas if runoff from adjacent cleared areas is excessive.

The soils in this map unit are not suited to building site development because of the steep slopes and instability of the gullied areas. Even nearby soils in other map units are at risk because gullies can spread into surrounding areas and undercut buildings.

This complex is not suited as sites for septic tank absorption fields because of steep slopes and the danger of slippage.

This complex is poorly suited as sites for roads and streets because of the steep slopes and danger of slippage. Low soil strength is a severe limitation even in areas that have been graded. Onsite investigation is needed before planning the use and management of these soils.

This complex is in capability subclass VIIe.

Ke—Keyespoint silty clay loam, occasionally flooded. This soil is deep, nearly level, and somewhat poorly drained. It is on the flood plain of the Mississippi River and is subject to flooding, generally from February through April. Flooding duration generally is only a few days, but severe flooding can inundate some lower-lying areas for a few weeks. Most areas of this soil are on broad, old, natural levees in slack-water areas that formed as a result of the shifting of the river channel. The mapped areas range from 5 to 250 acres. The slopes generally are long and smooth, but some short slopes are slightly steeper. The slopes are dominantly 0 to 2 percent.

Typically, this soil has a surface layer of very dark grayish brown silty clay loam about 6 inches thick. The subsoil, to a depth of 24 inches, is dark grayish brown clay that has mottles in shades of brown and gray. The substratum to a depth of 72 inches is dark grayish brown clay loam and brown very fine sandy loam that has mottles in shades of brown and gray.

Included with this soil in mapping are a few areas of Sharkey and Tunica soils. These soils are in lower positions on the landscape than Keyespoint soil or in depressional areas, and they are poorly drained. Also included are a few intermingled areas of soils that have an underlying loamy layer at a depth of less than 24 inches or at a depth of more than 40 inches.

The permeability of this soil is very slow in the upper clayey layers and moderate in the underlying loamy layers. The available water capacity is high. The content of organic matter is moderate, and the natural fertility is high. The soil reaction is mildly alkaline to medium acid. Surface runoff is slow, and erosion is not a hazard. This soil does not have good tilth, and a good seedbed is difficult to prepare. A seasonal water table is at a depth of 2 to 3.5 feet, depending on the water level in the river in the winter and spring. The rooting depth generally is not limited, but a prolonged high water table can limit root growth. This soil has a high shrink-swell potential in the upper, clayey layers.

Most of the acreage of this soil is used for row crops, but large areas are still in woodland. Most wooded areas are in the Anderson-Tully Management Area, and a few scattered wooded tracts are on the Mississippi River flood plain.

This Keyespoint soil is well suited to crops, such as soybeans, that can be planted later in the growing season after the danger of flooding has diminished and the surface has dried out. Good crop yields can be expected in favorable years. Fertilizer and lime are not needed in many areas because of the high natural fertility and level of pH in the soil; however, additional nitrogen generally is needed on crops, such as cotton, corn, small grains, and summer annual grasses. Soil

tests should be used to determine fertilizer requirements and to obtain maximum yields.

This soil is moderately suited to crops, such as corn and cotton, because these crops must be planted in the early spring when this soil is more subject to flooding and is still wet. Plowing the soil into ridges in the fall will help it dry out faster in the spring. This will save steps in seedbed preparation since the seeds can be planted directly into the ridges in the spring after minimal, additional preparation. This soil is poorly suited to small grains because of the flooding hazard. In some years, small grains are grown in a few higher areas, but even fields in the highest areas can be damaged by flooding. Drainage ditches are helpful in removing excess surface water from low or depressional areas. Subsurface drainage systems are not effective in this soil because of the slow permeability of the clayey layers and the possibility of flooding. The silty clay loam surface layer of this soil is difficult to till and hinders seedling emergence. It is also subject to plowpan formation.

This soil is well suited to pasture plants that are tolerant to wetness and to summer annual pasture grasses. It is poorly suited to alfalfa and small grains because of wetness and flooding during the winter.

The potential of this soil for the production of trees is high. Large areas are used for timber production. This soil is well suited to most hardwood trees that are tolerant to seasonal wetness. American elm, sugarberry, pecan, and sweetgum are the dominant trees in the wooded areas. Several wetland oaks and hickories are more abundant in areas where the soil reaction is more acid. Seasonal wetness and flooding restrict the use of equipment in managing and harvesting timber; therefore, operations involving heavy equipment are easier to accomplish in dry periods. Plant competition and seedling mortality are also concerns in woodland management. Planting trees that are tolerant to wetness at a time that allows the seedlings to become established before flooding occurs and controlling competing vegetation around the seedlings until they are well established will help them survive and increase their rate of growth.

Wetness and the high shrink-swell potential are severe limitations on building sites, and flooding is a severe hazard. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

This soil is not suited as sites for septic tank absorption fields because of flooding, slow percolation, and wetness.

Because of low strength, flooding, and high shrink-swell potential, this soil is poorly suited as sites for roads and streets. Adding a coarse-grained subgrade or base material and providing special construction for adequate support will prevent cracking and buckling, which are caused by the low soil strength and high shrink-swell potential. Raising the roadbed will help control flooding.

This Keyespoint soil is in capability subclass IIIw.

Kp—Keyespoint silty clay, occasionally flooded. This soil is deep, nearly level, and somewhat poorly drained. It is on the flood plain of the Mississippi River and is subject to flooding, generally from February through April. Flooding duration generally is several days, but severe flooding can inundate the area for a few weeks. This soil is on the back slopes of broad, old, natural levees in slack-water areas that formed as a result of the shifting of the river channel. The mapped areas range from 5 to 700 acres. The slopes generally are long and smooth, but some short slopes are slightly steeper. The slopes are dominantly 0 to 2 percent.

Typically, this soil has a surface layer of very dark grayish brown silty clay about 8 inches thick. The subsoil, to a depth of 30 inches, is dark grayish brown silty clay and clay that has mottles in shades of brown and gray. The substratum to a depth of 72 inches is brown silt loam and loamy fine sand. Mottles are in shades of brown and gray.

Included with this soil in mapping are a few areas of Tunica and Sharkey soils. These soils are in lower positions on the landscape than Keyespoint soil or in depressional areas, and they are poorly drained. Also included are a few intermingled areas of soils that have an underlying loamy layer at a depth of less than 24 inches, and a few areas that have an underlying loamy layer at a depth of more than 40 inches.

The permeability of this soil is very slow in the upper clayey layers and moderate in the loamy layers. The available water capacity is high. The content of organic matter is moderate, and the natural fertility is high. The soil reaction is mildly alkaline to medium acid. Surface runoff is slow, and erosion is not a hazard. This soil has poor tilth, and a good seedbed is difficult to prepare. Large, extremely hard clods form if the soil is worked when too wet or too dry. A seasonal water table is at a depth of 2 to 3.5 feet, depending on the water level in the river in the winter and spring. The rooting depth generally is not limited; however, in some years, root growth can be limited if the water table remains high for extended periods. This soil has a high shrink-swell potential in the clayey layers.

Most of the acreage of this soil is used for row crops

or as woodland. Most of the wooded areas are in the Anderson-Tully Wildlife Management Area. A few scattered wooded tracts are on the Mississippi River flood plain.

This Keyespoint soil is well suited to crops, such as soybeans, that can be planted later in the growing season after the danger of flooding has diminished and the surface has dried out. Good crop yields can be expected in favorable years. Fertilizer and lime are not needed in many areas because of the high natural fertility and the level of pH in the soil; however, additional nitrogen generally is needed on crops, such as cotton, corn, small grains, and summer annual grasses. Soil tests should be used to determine fertilizer requirements and to ensure maximum yields.

This soil is moderately suited to crops, such as corn and cotton, because these crops must be planted early in the spring when the soil is more subject to flooding and is still wet. Plowing the soil into ridges in the fall will help it dry out faster in the spring. This will save steps in seedbed preparation since the seeds can be planted directly into the ridges in the spring with little additional preparation. This soil is poorly suited to small grains because of the flooding hazard. In some years, small grains are grown in a few higher areas, but even fields in the highest areas can be damaged by flooding. Drainage ditches help to remove excess surface water in low or depressional areas. Subsurface drainage systems are not effective because of the slow permeability of the clayey layers and the flooding hazard.

This silty clay soil and several soils on the Mississippi River flood plain that have a clayey surface texture are sometimes locally referred to as "gumbo." The clayey surface of this soil is difficult to plow and hinders seedling emergence. It is critical that this soil be plowed at the correct moisture content to prepare a good seedbed. Large, extremely hard clods form if the soil is plowed when it is too wet or too dry. A compacted plowpan tends to form if the soil is worked over long periods with heavy equipment. The plowpan restricts root growth and water infiltration. Farming operations involving heavy equipment should be limited or consolidated, especially in wet conditions, and content of organic matter should be maintained or increased to help prevent or delay the formation of a plowpan.

This soil is most suitable to pasture plants that are tolerant to wetness and to summer annual pasture grasses. It is poorly suited to alfalfa and small grains because of wetness and flooding during the winter.

The potential of this soil for the production of trees is high. Large areas are used for timber production. This soil is well suited to most hardwood trees that are tolerant to seasonal wetness. American elm, sugarberry, pecan, and sweetgum are the dominant trees in the wooded areas. Several kinds of wetland oaks and hickories are abundant in areas where the soil reaction is more acid. Seasonal wetness and flooding restrict the use of equipment in managing and harvesting timber; therefore, operations involving heavy equipment are easier to accomplish in dry periods. Plant competition and seedling mortality are also concerns in woodland management. Planting trees that are tolerant to wetness at a time that allows the seedlings to become established before flooding occurs and controlling competing vegetation around the seedlings until they are well established will help them survive and increase their rate of growth.

Wetness and the high shrink-swell potential are severe limitations on building sites, and flooding is a hazard. Corrective measures to control flooding and overcome the limitations generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

This soil is not suited as sites for septic tank absorption fields because of flooding, slow percolation, and wetness.

Low strength and the high shrink-swell potential are limitations on sites for roads and streets, and flooding is a hazard. Using a coarse-grained subgrade or base material and providing special construction for adequate support help to prevent cracking and buckling, which are caused by the low soil strength and high shrink-swell potential. Raising the roadbed will help control flooding.

This Keyespoint soil is in capability subclass IIIw.

LoB2—Loring silt loam, 2 to 5 percent slopes, eroded. This soil is deep, gently sloping, and moderately well drained. It is on the tops of some lower ridges on rolling, loess uplands and on the side slopes on undulating, loess uplands. This soil has a dense, slowly permeable fragipan at a depth of about 24 inches. The mapped areas range from 5 to 50 acres.

Typically, this soil has a surface layer of dark brown silt loam about 7 inches thick. It includes subsoil material because erosion has removed part of the original surface layer. The upper part of the subsoil, to a depth of 24 inches, is a dark yellowish brown silt loam. The lower part to a depth of 62 inches is a dense, slowly permeable fragipan. It is dark brown and dark yellowish brown silt loam. Mottles are in shades of brown and gray.

Included with this soil in mapping are a few areas of Memphis soils that are in higher positions on the landscape than Loring soil. These soils are well drained, and they do not have a fragipan. Also included in the more sloping areas are some soils that have a fragipan at a depth less than is described as typical for the series.

The permeability of this soil is moderate above the fragipan and slow in the fragipan. The available water capacity is moderate or high, depending on the depth to the fragipan. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid or medium acid except where lime has been added. Surface runoff and the hazard of erosion are moderate. A perched water table is above the fragipan during wet periods. Plant root growth is severely restricted by the fragipan; therefore, the rooting depth generally corresponds to depth to the fragipan.

Most areas of this soil are used for cultivated crops or pasture. A small acreage is in woodland or is used for urban development.

This Loring soil is suited to a variety of row crops and small grains. Good yields can be obtained with proper management and if fertility and the level of pH in the soil is maintained as recommended by soil tests. Erosion is a moderate hazard affecting crop production. Terraces, contour farming, and grassed waterways will reduce erosion in cultivated areas. The low content of organic matter causes crusting and excessive clod formation. Conservation tillage, winter cover crops, and crop rotation increase the content of organic matter and reduce erosion. The available water capacity and rooting depth are limitations that also affect crop production. These limitations can be minimized if proper conservation practices are used and erosion is controlled. In dry years, yields are reduced for crops, such as corn, that are highly susceptible to moisture stress.

This soil is well suited to hay and pasture plants. Tall fescue or bermudagrass, in combination with white clover, is commonly grown and is well adapted to this soil. Controlled grazing and adequate fertilizer help control erosion and sustain productivity of the pasture plants. This soil is not well suited to alfalfa because of a restricted root zone.

The potential of this soil for the production of trees is high. This soil is well suited to most trees commonly grown in the area. Woodland areas consist of small isolated woodlots of mixed hardwoods. Oak and hickory are the dominant trees in the wooded areas. Plant competition is the only significant concern in woodland use and management.

This soil is moderately suited to building site development and engineering uses. Wetness, caused by the seasonal perched high water table, is a severe limitation affecting buildings with basements. Installing foundation drains and sealing foundations will prevent wetness in basements.

This soil is poorly suited as sites for septic tank absorption fields because of seasonal wetness and slow permeability of the fragipan.

Low strength is the main limitation on sites for local roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength.

This Loring soil is in capability subclass IIe.

LoB3—Loring silt loam, 2 to 5 percent slopes, severely eroded. This soil is deep, gently sloping, and moderately well drained. It is on side slopes and lower ridgetops on undulating to rolling, loess uplands. This soil has a dense, slowly permeable fragipan at a depth of about 17 inches. The mapped areas range from 5 to 100 acres.

Typically, this soil has a surface layer of dark yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of 17 inches, is dark yellowish brown silt loam. The lower part, to a depth of 53 inches, is a dense, slowly permeable fragipan. It is a dark brown silt loam that has mottles in shades of brown and gray. The substratum is brown, unconsolidated loess.

Erosion has removed all of the original surface layer and part of the subsoil in the major part of this map unit. In many small areas, erosion has removed nearly all of the subsoil above the fragipan. Other small areas are less eroded than is described as typical for the series. These areas are too intermingled or are too small to map separately or to manage effectively. Some areas include shallow gullies and a few deep gullies; however, most areas are cropland and the gullies are filled when the soil is prepared for seeding.

Included with this soil in mapping are a few areas of Memphis soils. These soils are in higher positions on the landscape than Loring soil, are well drained, and do not have a fragipan.

The permeability of this soil is moderate above the fragipan and slow in the fragipan. The available water capacity is moderate. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid or medium acid except where lime has been added. Surface runoff and the hazard of erosion are moderate. A perched water table is above the

fragipan during wet periods. Plant root growth is restricted by the fragipan; therefore, the rooting depth generally corresponds to depth to the fragipan.

Most areas of this soil are used for cultivated crops. A smaller acreage is used as pasture or woodland or for urban development.

This Loring soil is moderately suited to row crops that are not sensitive to moisture stress. Moderate yields of soybeans and cotton can be obtained if rainfall is adequate during the growing season. This soil is poorly suited to crops, such as corn, that are highly susceptible to moisture stress. In many years, optimum yields of these crops cannot be obtained because of the low available water capacity. This soil is moderately suited to small grains; however, stands can be damaged by excessively dry weather in the fall. Crop production is limited mainly by the low available water capacity and the erosion hazard. These problems are related because the low available water capacity is caused by past erosion, and it will be lowered further by any additional erosion. Contour farming, terraces, and grassed waterways will reduce erosion in cultivated areas. Conservation tillage, winter cover crops, and crop rotation reduce erosion and increase the content of organic matter. The increased organic matter content will reduce crusting and cloddiness, which is common in this soil.

This soil is moderately suited to pasture and hay production. Tall fescue or bermudagrass, in combination with white clover, is commonly grown. This soil will produce optimum yields of forage if rainfall is adequate, but forage yields are reduced significantly during dry weather because of the low available water capacity. Controlled grazing and adequate fertilizer help control erosion and sustain productivity. This soil is poorly suited to alfalfa because of the low available water capacity, seasonal wetness, and shallow rooting depth.

The potential of this soil for the production of trees is good. This soil is well suited to most trees grown in the area. Woodland areas consist of small isolated woodlots of mixed hardwoods. Oaks and hickories are the dominant trees in the wooded areas. Plant competition is a concern in woodland management. Controlling competing vegetation around seedlings and young trees will allow them to become established and increase their rate of growth.

This soil is moderately suited to building site development and other engineering uses. Wetness, caused by the seasonal perched water table, is a severe limitation affecting buildings with basements. Installing foundation drains and sealing foundations will prevent wetness in basements.

This soil is poorly suited as sites for septic tank absorption fields because of seasonal wetness and slow permeability of the fragipan.

Low strength is the main limitation on sites for local roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength.

This Loring soil is in capability subclass IIIe.

LoC2—Loring silt loam, 5 to 8 percent slopes, eroded. This soil is deep, moderately sloping, and moderately well drained. It is on side slopes and on the tops of some lower ridges on rolling, loess uplands. This soil has a dense, slowly permeable fragipan at a depth of about 24 inches. The mapped areas are 5 to 60 acres.

Typically, this soil has a surface layer of brown silt loam about 7 inches thick. It includes subsoil material because erosion has removed part of the original surface layer. The upper part of the subsoil, to a depth of 24 inches, is a dark yellowish brown silt loam. The lower part to a depth of 62 inches is a dense, slowly permeable fragipan. It is a dark yellowish brown and dark brown silt loam that has mottles in shades of brown and gray.

Included with this soil in mapping are a few small areas of Memphis soils. These soils are on higher ridgetops than Loring soil, are well drained, and do not have a fragipan. Also included in the more sloping areas are soils that have a fragipan at a depth less than is described as typical for the series. Memphis soils make up less than 5 percent of the map unit.

The permeability of this soil is moderate above the fragipan and slow in the fragipan. The available water capacity is moderate or high, depending on the depth to the fragipan. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid or medium acid except where lime has been added. Surface runoff is moderately rapid, and the hazard of erosion is severe if the soil is cultivated. A perched water table is above the fragipan during wet periods. Plant root growth is restricted by the fragipan; therefore, the rooting depth generally corresponds to depth to the fragipan.

Most areas of this soil are used for cultivated crops or pasture. A small acreage is in woodland or used for urban development.

This Loring soil is moderately suited to row crops and small grains. Cropland production is mainly limited by the severe erosion hazard and limited available water capacity. Terracing, contour plowing, conservation

tillage, winter cover crops, and crop rotation will reduce the erosion hazard and increase the content of organic matter. These soils are not suited to continuous row cropping; therefore, pasture or close-grown crops should be used in the crop rotation system. Depth to the fragipan and the low available water capacity are limitations that can be minimized if proper conservation practices are used and erosion is controlled. This soil is moderately suited to crops, such as corn, that are highly susceptible to moisture stress. This soil is poorly suited to alfalfa because of seasonal wetness and the limited rooting depth.

This soil is well suited to pasture and hay production. Tall fescue or common bermudagrass, in combination with white clover, is commonly grown. Controlled grazing and adequate fertilizer help control erosion and sustain productivity.

The potential of this soil for production of trees is high. This soil is well suited to most trees grown in the area. Woodland areas consist of small isolated woodlots of mixed hardwoods. Oaks and hickories are the dominant trees in the wooded areas. The erosion hazard and plant competition are moderate concerns in woodland use and management.

This soil is moderately suited to most engineering uses. Wetness, caused by the seasonal high water table, is a severe limitation affecting buildings with basements. Installing foundation drains and sealing foundations will prevent wetness in basements.

This soil is poorly suited as sites for septic tank absorption fields because of seasonal wetness and slow permeability.

Low strength is the main limitation on sites for local roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength.

This Loring soil is in capability subclass IIIe.

LoC3—Loring silt loam, 5 to 8 percent slopes, severely eroded. This soil is deep, moderately sloping, and moderately well drained. It is on hillsides on rolling, loess uplands. This soil has a dense, slowly permeable fragipan at a depth of about 17 inches. The mapped areas are long and irregular in shape and meander around the sides of rolling hills and ridges. These areas range from 5 to 175 acres.

Typically, this soil has a surface layer of dark yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 17 inches, is dark yellowish brown silt loam. The lower part, to a depth of 53 inches, is a dense, slowly permeable fragipan. It is a dark brown silt loam that has mottles in shades of brown and gray. The substratum is brown, unconsolidated loess.

Erosion has removed all of the original surface layer and part of the subsoil in the major part of this map unit. In many small areas, erosion has removed nearly all of the subsoil above the fragipan. Other small areas are less eroded than is described as typical for the series. These areas are too intermingled or are too small to map separately or to manage effectively. Some areas include shallow gullies and a few deep gullies; however, many areas are cropland and the gullies are filled when the soil is prepared for seeding.

Included with this soil in mapping are a few small areas of Memphis soils. These soils are in higher positions on the landscape than Loring soil, are well drained, and do not have a fragipan. The included soils make up less than 5 percent of the map unit.

The permeability of this soil is moderate above the fragipan and slow in the fragipan. The available water capacity is moderate. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid or medium acid except where lime has been added. Surface runoff is moderately rapid, and the hazard of erosion is severe if the soil is cultivated. A perched water table is above the fragipan during wet periods. Plant root growth is restricted by the fragipan; therefore, the rooting depth generally corresponds to depth to the fragipan.

Most areas of this soil are used for cultivated crops or pasture. A small acreage is in woodland or is used for urban development.

This Loring soil is poorly suited to most row crops because of the severe erosion hazard and low available water capacity. Terracing and contour farming will reduce erosion. Conservation tillage, winter cover crops, and crop rotation also will reduce erosion and increase the content of organic matter. This soil is not suited to continuous row cropping because of the erosion hazard; therefore, pasture or close-grown crops are needed in the crop rotation system. Fair yields of soybeans and cotton can be obtained if rainfall is adequate during the growing season. This soil is poorly suited to crops, such as corn, that are highly susceptible to moisture stress, and yields of these crops generally are not good. This soil is moderately suited to small grains; however, stands can be damaged by dry weather in the fall. The adverse effects of the low available water capacity can be minimized and erosion can be controlled if proper conservation practices are used.

This soil is moderately suited to pasture and hay production. Tall fescue or common bermudagrass, in

combination with white clover, is commonly grown. This soil will produce optimum yields of forage if rainfall is adequate, but forage production is reduced during the dry summer months. Controlled grazing and adequate fertilizer help control erosion and sustain productivity.

The potential of this soil for the production of trees is good. This soil is well suited to most trees grown in the area. Woodland areas consist of small isolated woodlots of mixed hardwoods. Various oaks and hickories are the dominant trees in the wooded areas. The erosion hazard and plant competition are moderate concerns in woodland use and management. Controlling competing vegetation around seedlings and young trees will allow them to become established and increase their rate of growth.

This soil is moderately suited to building site development and other engineering uses. Wetness, caused by the seasonal perched water table, is a severe limitation affecting buildings with basements. Installing foundation drains and sealing foundations will prevent wetness in basements.

This soil is poorly suited as sites for septic tank absorption fields because of seasonal wetness and slow permeability in the fragipan.

Low strength is the main limitation on sites for local roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength.

This Loring soil is in capability subclass IVe.

LoD3—Loring silt loam, 8 to 12 percent slopes, severely eroded. This soil is deep, strongly sloping, and moderately well drained. It is on side slopes on hilly, loess uplands. This soil has a compact, slowly permeable fragipan at a depth of about 17 inches. The mapped areas range from 5 to 100 acres. The slopes are irregular in shape and dissected.

Typically, this soil has a surface layer of dark yellowish brown silt loam about 6 inches thick. The upper part of the subsoil, to a depth of about 17 inches, is dark yellowish brown silt loam. The lower part, to a depth of 53 inches, is a dense, slowly permeable fragipan. It is dark brown silt loam that has mottles in shades of brown and gray. The substratum is brown, unconsolidated loess.

Erosion has removed all of the original surface layer and part of the subsoil in the major part of this map unit. In many small areas, erosion has removed nearly all of the subsoil above the fragipan. Other small areas are less eroded than is described as typical for the series. These areas are too intermingled or are too small to map separately or to manage effectively. Some areas include shallow gullies and a few deep gullies.

Included with this soil in mapping are a few small areas of Memphis soils. These soils are on high, narrow ridgetops and are well drained.

This Loring soil is moderately permeable above the fragipan and slowly permeable in the fragipan. The available water capacity is moderate. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid or medium acid except where lime has been added. Surface runoff is rapid, and the hazard of erosion is very severe if the soil is cultivated. A perched water table is above the fragipan for brief periods during wet weather. Plant root growth is restricted by the fragipan; therefore, the rooting depth generally corresponds to depth to the fragipan.

Most areas of this soil are used for cultivated crops or pasture. A small acreage is in woodland or is used for urban development.

This Loring soil is not suited to row crops because of the severe erosion hazard and low available water capacity. Even conservation tillage, crop rotation, and winter cover crops can not reduce erosion to an acceptable level. The low available water capacity is a special concern since rapid runoff reduces the rate of water infiltration and recharge of the available water in the soil.

This soil is moderately suited to pasture and hay production. Forage production is limited mainly by the erosion hazard and low available water capacity. Keeping a good, solid cover of grass and legumes on the surface will help control erosion. Maintaining proper levels of pH and soil fertility according to soil test determinations, controlling weeds, controlling grazing, and periodically renovating or reestablishing pastures will ensure adequate ground cover and maximum yields. Establishing and renovating pastures can be difficult because of the moderately steep slopes. Preparing a good seedbed, applying adequate fertilizer and lime, and planting sufficient seed on correct seeding dates will help ensure a good stand of grasses and legumes. Grass and legume pastures should be well established before cattle are allowed to graze to ensure adequate ground cover and long-lasting stands. This soil is suited to most grasses and legumes that are commonly grown in the area. Yields are significantly reduced in dry weather because of the low available water capacity. This soil is poorly suited to alfalfa because of seasonal wetness and limited rooting depth.

The potential of this soil for the production of trees is good. Woodland areas consist of scattered tracts. Various oaks and hickories are the dominant trees in

the wooded areas. The erosion hazard and plant competition are moderate concerns in woodland use and management. Controlling competing vegetation around seedlings and young trees will allow them to become established and increase their rate of growth.

Wetness and a seasonal high water table are severe limitations affecting buildings with basements. Installing foundation drains and sealing foundations will prevent wetness in basements.

This soil is poorly suited as sites for septic tank absorption fields because of seasonal wetness and slow permeability of the fragipan.

Low strength is the main limitation on sites for local roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material helps prevent damage caused by low soil strength.

This Loring soil is in capability subclass VIe.

MeB2—Memphis silt loam, 2 to 5 percent slopes, eroded. This soil is deep, gently sloping, and well drained. It is on long, narrow ridgetops on steep, highly dissected uplands and on broad, irregular ridgetops in less steep areas. The mapped areas range from 5 to 350 acres.

Typically, this soil has a surface layer of dark yellowish brown silt loam about 6 inches thick. It includes subsoil material because erosion has removed part of the original surface layer. The subsoil, to a depth of 56 inches, is dark brown silt loam. The substratum to a depth of 62 inches is dark brown silt loam.

Included with this soil in mapping are a few intermingled areas of Loring soils. These soils have a dense, compact fragipan in the lower part of the subsoil. The included soils make up less than 5 percent of the map unit.

This soil has a deep root zone that is moderately permeable to air and water movement. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid or medium acid except where lime has been added. Surface runoff and the hazard of erosion are moderate.

Most areas of this soil are used for row crops. Some areas are used for pasture or urban development.

This Memphis soil is well suited to a wide variety of row crops and small grains. High yields can be obtained if proper management is used and fertility and proper levels of pH are maintained. Cropland production is limited mainly by the moderate erosion hazard. Terraces, contour farming, and grassed waterways reduce erosion in cultivated areas. Conservation tillage, winter cover crops, and crop rotation increase the content of organic matter and also reduce erosion.

This soil is well suited to hay and pasture production. It is well suited to most grasses and legumes commonly grown in the area, including alfalfa. Maintaining fertility and pH at the proper levels and controlling grazing will sustain productivity and help control erosion.

The potential of this soil for production of trees is moderately high. This soil is suited to a variety of trees. Woodland areas consist of a few small scattered woodlots. Various oaks, hickories, and yellow poplar are the dominant trees in the wooded areas. Plant competition is the only concern in management.

This soil is well suited to building site development and most other urban uses. Septic tank absorption fields generally are satisfactory on this soil if they are properly designed and installed.

Low strength is the main limitation on sites for local roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by the low soil strength.

This Memphis soil is in capability subclass IIe.

MeC2—Memphis silt loam, 5 to 8 percent slopes, eroded. This soil is deep, moderately sloping, and well drained. It is on long, narrow ridgetops on steep, highly dissected, loess uplands, and is on broad, irregular ridgetops and on some side slopes on rolling to hilly, loess uplands. The mapped areas are 5 to 475 acres. The slopes are short to moderately long and are irregular in shape.

Typically, this soil has a surface layer of dark yellowish brown silt loam about 6 inches thick. It includes subsoil material because part of the original surface layer has been removed by erosion. The subsoil, to a depth of 56 inches, is dark brown silt loam. The substratum to a depth of 62 inches or more is dark brown silt loam.

Included with this soil in mapping are a few intermingled areas of Loring soils. These soils have a dense, compact fragipan in the lower part of the subsoil. Also included are some severely eroded soils that have a plow layer that is made up of subsoil material. Loring soils make up less than 10 percent of the map unit.

This soil has a deep root zone that is moderately permeable to air and water movement. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid to medium acid except where lime has been added. Surface runoff is moderately rapid, and the

hazard of erosion is severe if the soil is cultivated. This soil has good tilth if it is not plowed when it is too wet.

Most areas of this soil are used for cultivated crops. Some areas are used for pasture or urban development.

This Memphis soil is well suited to a wide variety of row crops and small grains. Optimum yields can be obtained if proper management practices are used and fertility and pH are maintained at levels recommended by soil tests. This soil is not suited to continuous row cropping because of the erosion hazard, and productivity and tilth will decrease if erosion increases. Terraces, contour farming, and grassed waterways will reduce erosion in cultivated areas. Conservation tillage, no-tillage, winter cover crops, and crop rotation also will reduce erosion and increase the content of organic material.

This soil is well suited to pasture and hay production. It is well suited to most grasses and legumes that are adapted to the local climate and will produce optimum yields. Maintaining fertility and pH at the proper levels and controlling grazing will sustain productivity and help control erosion. This soil is well suited to alfalfa and will produce optimum yields of hay.

The potential of this soil for the production of trees is good. This soil is suited to a variety of trees. Woodland areas consist of a few small, scattered woodlots. Various oaks, hickories, and yellow poplar are the dominant trees in the wooded areas. The erosion hazard and plant competition are concerns in management.

This soil is well suited to building site development and most other urban uses. Care should be taken to prevent erosion during construction, and vegetation should be established on the site as soon as possible. Septic tank absorption fields systems generally are satisfactory on this soil if they are properly designed and installed.

Low strength is the main limitation on sites for local roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength.

This Memphis soil is in capability subclass IIIe.

MeD3—Memphis silt loam, 8 to 12 percent slopes, severely eroded. This soil is deep, strongly sloping, and well drained. It is on hillsides on dissected, loess uplands. Rills and shallow gullies are in some places. The mapped areas range from 5 to 90 acres. The slopes are irregular in shape and are dissected by a complex drainage pattern.

Typically, this soil has a surface layer of dark yellowish brown silt loam about 6 inches thick. It includes subsoil material because the original surface layer has been removed by erosion. The subsoil, to a depth of about 40 inches, is dark brown silt loam. The substratum to a depth of more than 60 inches is dark brown silt loam.

Included with this soil in mapping are a few intermingled areas of Loring soils and small areas of Morganfield and Adler soils. These soils are in long, narrow drainageways. Also included are some areas of very severely eroded soils. Erosion has removed most of the subsoil. In addition, these soils have a slightly acid or neutral, loess substratum that is within 1 to 2 feet of the surface.

This soil has a deep root zone that is moderately permeable to air and water movement. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid or medium acid except where lime has been added. Surface runoff is rapid, and the hazard of erosion is very severe if the soil is cultivated. This soil generally has good tilth, but the surface can be cloddy if it is plowed when wet or very dry.

Much of the acreage of this soil is used for row crops. Some acreage is used for pasture, and a few areas are in woodland or are used for urban development.

This Memphis soil generally is not suited to row crops because of the very severe erosion hazard. Even conservation tillage, crop rotation, and winter cover crops can not reduce erosion to an acceptable level if row crops are grown.

This soil is well suited to pasture and hay production. Optimum yields of forage can be produced if pastures are maintained properly, although yields are reduced during dry, summer weather. Erosion is a hazard on pastureland. Maintaining a good cover of grass or legumes at all times will help control erosion. Maintaining proper levels of pH and soil fertility according to soil tests, controlling weeds, controlling grazing, and periodically renovating or reestablishing pastures will ensure adequate ground cover and maximum yields. Preparing a good seedbed, applying adequate fertilizer and lime, and planting sufficient seed at the correct time of the year will help ensure a good stand of grasses or legumes. Grasses and legumes should be well established as a complete plant cover before allowing cattle to graze. This soil is well suited to most legumes and grasses, including alfalfa, that are commonly grown in the area.

The potential of this soil for the production of a wide

variety of trees is good. Woodland areas consist of scattered tracts of various shapes and sizes. Yellow poplar and various oaks and hickories are dominant trees in the wooded areas. The erosion hazard and plant competition are the only significant concerns in management.

Slope is a moderate limitation to building site development. Conforming to the natural slope or shaping the site to accommodate the building will help overcome this limitation. Diversions above the building site and mulch on the site will help control erosion during construction. Establishing vegetation as soon as possible after construction will help protect the site from future erosion.

This soil is moderately suited as sites for septic tank absorption fields because of slope. Septic tank absorption fields that are designed and properly installed on the contour generally are satisfactory.

Low strength is the main limitation on sites for local roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength.

This Memphis soil is in capability subclass VIe.

MeE3—Memphis silt loam, 12 to 20 percent slopes, severely eroded. This soil is deep, moderately steep, and well drained. It is on the side slopes of long, branching ridges on highly dissected loess uplands. The mapped areas are 5 to 425 acres. The slopes are irregular in shape and deeply dissected by a complex drainage pattern. Rills and shallow gullies are common, and a few deep gullies are in some places.

Typically, this soil has a surface layer of dark brown silt loam about 6 inches thick. It includes subsoil material because the original surface layer has been removed by erosion. The subsoil, to a depth of about 40 inches, is dark brown silt loam. The substratum to a depth of more than 60 inches is dark brown silt loam.

Included with this soil in mapping are some areas of Morganfield and Adler soils and a few areas of Loring soils. Morganfield and Adler soils are in long, narrow drainageways. In addition, Adler soils are moderately well drained. Loring soils are on the lower part of the slopes, on the foot slopes, and are moderately well drained. Also included are some areas of very severely eroded soils. Erosion has removed most of the original subsoil. In addition, these soils have a slightly acid or neutral, loess substratum. In the wooded areas are some soils that are not eroded.

This soil has a deep root zone that is moderately permeable to air and water movement. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid or medium acid except where lime has been added. Surface runoff is very rapid, and the hazard of erosion is very severe.

Most of the acreage of this soil is used for pasture (fig. 9). Some areas are in woodland, and a few areas are idle land. The idle land, which was previously cropland or pasture, has been abandoned and is in weeds and brush.

This Memphis soil is not suited to row crops and small grains because of the moderately steep slopes and very severe erosion hazard. If cropped, an extremely high rate of soil is lost because of sheet erosion, and rills and gullies form quickly. No erosion control practice or combination of practices will reduce soil loss to an acceptable level.

This soil is moderately suited to pasture and hay production. The steep slopes are the main limitation affecting the use of equipment, and erosion is a hazard. Acceptable yields of forage can be produced if pastures are properly maintained, although yields are greatly reduced during dry, summer weather. The ability of this soil to supply moisture for forage crops is reduced by the steep slopes because of very rapid runoff, which results in poor infiltration. Maintaining a thick, continuous plant cover will help slow runoff, increase infiltration, and control erosion. Maintaining proper levels of pH and soil fertility according to soil tests, controlling weeds, controlling grazing, and periodically renovating or reestablishing pastures will ensure adequate ground cover and produce maximum yields. Establishing and renovating pastures are difficult because of the steep slopes. Preparing a good seedbed, applying adequate fertilizer and lime, and planting sufficient seed on the correct seeding dates will help ensure a good stand of grasses and legumes. Grasses and legumes should be well established as a complete plant cover before allowing cattle to graze. This soil is well suited to most legumes and grasses, including alfalfa, that are commonly grown in the area.

The potential of this soil for the production of a wide variety of trees is good. Yellow poplar, sweetgum, maple, and various oaks and hickories are the dominant trees in the wooded areas. The hazard of erosion is the major concern in woodland management. Using care not to remove the leaf litter while harvesting timber and allowing vegetation to reestablish quickly will reduce the hazard of erosion. Gullies often form along old logging roads; therefore, roads should be run across slopes as much as possible.

This soil is poorly suited to building site development

Figure 9.—Using Memphis silt loam, 12 to 20 percent slopes, severely eroded, as pasture is one of the best ways to protect this soil from further erosion.

because of the moderately steep slopes. Conforming to the natural slope or shaping the land will help overcome this limitation in some situations; however, building site development on this soil can be costly, and long-range problems can result because of soil erosion and slumping. Diversions above the building site and mulch on the site will help control erosion during construction. Establishing vegetation as soon as possible after construction will help protect the site from future erosion.

Moderately steep slopes are a severe limitation on sites for septic tank absorption fields. Land shaping, installing field lines across the slope, and installing lines on a less steep soil included in the map unit will help overcome this limitation. An alternate site should be selected in some situations. Regulations concerning septic tank absorption field lines should be observed.

Low strength and moderately steep slopes are severe limitations on sites for local roads and streets. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength. Constructing on the contour, land shaping and grading, and adapting road design to the slope will help overcome the slope limitation.

This Memphis soil is in capability subclass VIe.

MeF—Memphis silt loam, 20 to 40 percent slopes. This soil is deep, steep, and well drained. It is on the side slopes of long, steep, branching ridges that have narrow, gently sloping to moderately sloping tops. These ridges are on highly dissected uplands covered by thick loess. The mapped areas range from 5 to 850

Figure 10.—Woodland is the major use of Memphis silt loam, 20 to 40 percent slopes. If these areas are cleared, the hazard of erosion will be severe.

acres. The slopes are irregular in shape and are dissected by a deeply entrenched and highly branched drainage pattern.

Typically, this soil has a surface layer of dark grayish brown silt loam about 2 inches thick. The subsurface layer, to a depth of 6 inches, is brown silt loam. The subsoil, to a depth of about 50 inches, is dark brown silt loam. The substratum to a depth of more than 62 inches is dark brown silt loam.

Included with this soil in mapping are some areas of Morganfield and Adler soils. These soils are in long, narrow drainageways. In addition, Adler soils are moderately well drained. Also included are some areas of very steep soils that have slopes of more than 40 percent, and a few areas of some severely eroded soils that have been cleared and all of the original surface layer and part of the subsoil have eroded away. Also included are some areas of soils in which natural drainageways have developed into large, actively eroding gullies that are 5 to 20 feet deep. These gullies are the result of logging activities or accelerated runoff from the adjacent intensively farmed lands. If the slopes

have been undercut by gullies or streams, massive slumps have left high vertical walls of unweathered loess exposed.

This soil has a deep root zone that is moderately permeable to air and water movement. The available water capacity is high. The content of organic matter is moderate, and the natural fertility is medium. The soil reaction is strongly acid or medium acid. Surface runoff is very rapid, and the hazard of erosion is very severe.

Most of the acreage of this soil is in woodland (fig. 10) Some areas are used for pasture. A few areas, which were previously cleared, are idle land and are in weeds and brush.

This Memphis soil is poorly suited to row crops and small grains because of the steep slopes and very severe erosion hazard. Erosion control practices or a combination of practices will not reduce soil loss to an acceptable level.

This soil is poorly suited to pasture and hay production. Pastures are very difficult to establish and maintain on the very steep slopes. Severe erosion results when a dense, continuous plant cover is not maintained. Cow paths quickly develop into gullies.

The potential of this soil for the production of trees is good. Woodland areas consist of large tracts with stands of varying maturity and composition. Yellow poplar, American beech, sweetgum, maples, and various oaks and hickories are the dominant trees in most of the wooded areas. Steep slopes that restrict the use of equipment and the severe erosion hazard are the major concerns in management. Using care not to remove leaf litter or to cut ruts in the ground while harvesting timber and allowing vegetation to reestablish quickly will reduce the erosion hazard. Gullies often form along old logging roads; therefore, roads should run across slopes as much as possible.

This soil is poorly suited to building site development because of the steep slopes. Construction would be extremely costly. Gullies and slumping are likely to occur if this soil is disturbed.

Steep slopes are a severe limitation affecting septic tank absorption fields. An alternate site should be selected.

Low strength and steep slopes are severe limitations on sites for roads and streets. The use of a coarse-grained subgrade or base material will prevent damage caused by low soil strength. Constructing roads on the contour, land shaping and grading, and adapting road design to the slope will help overcome the slope limitation.

This Memphis soil is in capability subclass VIIe.

Mo—Morganfield silt loam, occasionally flooded. This soil is deep, nearly level, and well drained. It is on the flood plains and in narrow drainageways associated with loess uplands. Most areas are subject to flooding, mostly in the winter and early in the spring. Flooding is of brief duration and generally lasts only a few hours. The mapped areas are mostly long and narrow. They are highly branched in steep, highly dissected areas. The mapped areas range from 5 to 550 acres. The slopes range from 0 to 2 percent.

Typically, this soil has a surface layer of dark brown silt loam about 9 inches thick. The upper part of the underlying material, to a depth of about 37 inches, is dark brown silt loam. Mottles are in shades of brown. The lower part to a depth of 60 inches is mottled brown, grayish brown, and dark brown silt loam.

Included with this soil in mapping are a few intermingled areas of Adler soils, which are moderately well drained. Also included are some areas of soils that are below the flood control dams in the Cane Creek watershed and that are rarely flooded; some soils in areas near the loess bluff that have layers of sandy loam or layers of a coarser texture; and soils that are in a few areas along the base of the bluff and have slopes that range from 0 to 5 percent.

The permeability of this soil is moderate. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium to high. The soil reaction is medium acid to mildly alkaline. Surface runoff is slow, and erosion is not a hazard. This soil has good tilth, and a good seedbed is easy to prepare if the soil is not worked when it is very wet. The water table is within 3 or 4 feet of the surface at times during the winter and spring. The root zone is deep and is easily penetrated by plant roots.

Most of the acreage of this soil has been cleared and is used for crops. A few areas are in woodland or are used for pasture.

This Morganfield soil is well suited to many row crops, vegetables, specialty crops, and small grains. Maximum yields can be obtained if proper management practices are used. Crops respond well to applications of fertilizer. Soil tests should be used to determine fertilizer and lime requirements. Most nonlegumes respond well to nitrogen, but cotton grows tall and rank and matures late if excess nitrogen is applied to the soil, especially during wet summers. Flooding can damage small grain crops; therefore, small grains should be planted in higher areas that are flooded less often and where surface water can drain off rapidly.

This soil is well suited to most pasture and hay crops

that are commonly grown in the area, and optimum yields of forage are produced. Fescue or bermudagrass, in combination with white clover, is most commonly grown on this soil. This soil is well suited to summer annual grasses. It will produce optimum yields of alfalfa, but stands will thin out in low areas because of flooding.

This soil is well suited to the production of trees. Most trees that are tolerant to occasional flooding are well adapted to this soil. Woodland areas consist mainly of small woodlots. Eastern cottonwood, American sycamore, sweetgum, and various oaks are the dominant trees in the wooded areas. Controlling competing vegetation around seedlings will allow them to become established and increase their rate of growth.

Flooding is a severe hazard on building sites. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

This soil is poorly suited as sites for septic tank absorption fields and for local roads and streets because of flooding. Raising the roadbed to help control flooding can be a feasible solution to the problem in some places.

This Morganfield soil is in capability subclass IIw.

Op—Openlake silty clay loam, occasionally flooded. This soil is deep, nearly level, and somewhat poorly drained. It is on the flood plain of the Mississippi River and is subject to occasional flooding, generally from February through April. In most areas, flooding duration is several days, but some low areas are inundated for a few weeks. The mapped areas are long and broad and are roughly parallel to, but not adjacent to, present or old river channels. The mapped areas range from 10 to 500 acres. The slopes are dominantly 0 to 2 percent, but some short slopes are slightly steeper.

Typically, this soil has a surface layer of very dark grayish brown silty clay loam about 7 inches thick. The subsoil, to a depth of 68 inches, is dark grayish brown silty clay or clay. Mottles are in shades of brown and red. The faces of peds are coated with dark gray at a depth of more than 30 inches, or the matrix is dark gray in some pedons. The substratum to a depth of 75 inches or more is gray clay.

Included with this soil in mapping are a few areas of Sharkey, Tunica, Commerce, and Keyespoint soils. Sharkey and Tunica soils are in lower positions on the landscape than Openlake soils or are in depressional areas. These soils are poorly drained. Commerce and Keyespoint soils are intermingled with Openlake soil. Commerce soils have less than 35 percent clay, and Keyespoint soils are underlain by loamy textured layers at a depth of 20 to 40 inches. Also included are a few intermingled areas of a soil that is strongly acid in one or more layers between depths of 10 and 40 inches.

The permeability of this soil is slow in the surface layer and very slow in the subsoil and substratum. The available water capacity is high. The content of organic matter is medium, and the natural fertility is high. The soil reaction is strongly acid to mildly alkaline. Surface runoff is slow, and erosion is not a hazard. This soil has fairly poor tilth and can only be worked within a narrow range of moisture content without forming hard clods. A seasonal water table is at a depth of 1.5 to 3 feet during much of the winter and spring. The rooting depth is not limited during the growing season, but the high water table can affect the root growth of some perennial plants during wet periods. This soil has a high shrink-swell potential. It shrinks and cracks as it dries and swells when wet.

Most areas of this soil are used for row crops or as woodland. Most of the cleared land has been planted to soybeans, and smaller acreages are in corn, cotton, and other crops. Most of the wooded acreages are in the Anderson-Tully Wildlife Management Area. A few scattered wooded tracts of various sizes are on the Mississippi River flood plain.

This Openlake soil is better suited to soybeans and grain sorghum because they are tolerant to some flooding and wetness and can be planted late and harvested early (fig. 11). Optimum yields can be obtained without adding fertilizer or lime to the soil. Additional applications of nitrogen are needed if cotton, corn, small grains, or summer annual grasses are grown. Soil tests should be used to determine fertilizer, lime, and nitrogen requirements to obtain maximum yields. This soil is only moderately suited to crops, such as cotton or corn, that require early planting and a long growing season. Plowing the soil into ridges in the fall will help it dry out faster in the spring. This will save steps in seedbed preparation since the seed can be planted directly into the ridges in the spring with little additional preparation. Even with this kind of preparation, the lower areas may still be too wet for early planting. Drainage ditches are helpful in removing excess surface water in low or depressional areas. Subsurface drainage systems are not effective because of the slow permeability of this soil. The silty clay loam surface layer is difficult to till and hinders seedling emergence. This soil is subject to plowpan formation.

Figure 11.—Soybeans and grain sorghum, which are tolerant to some flooding and wetness and can be planted late and harvested early, in an area of Openlake silty clay loam, occasionally flooded.

This soil is poorly suited to perennial pasture plants, hay, and small grains because of wetness and flooding during the winter. It is well suited to summer annual pasture grasses.

The potential of this soil for production of trees is high. Large areas are used for timber production. This soil is well suited to most bottom-land hardwood trees that are tolerant to wetness. American elm, sugarberry, eastern cottonwood, pecan, cherrybark oak, and sweetgum are the dominant trees in the wooded areas. Wetness and flooding restrict the use of equipment in managing and harvesting timber; therefore, operations involving heavy equipment should be done in dry periods. Seedling mortality is a moderate concern in management because of wetness and flooding.

Wetness and the high shrink-swell potential are severe limitations affecting building site development and most other urban uses. Also, flooding is a severe hazard. Corrective measures to overcome these problems, especially flooding, generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied.

Because of slow permeability, the seasonal high water table, and flooding, this soil is not suitable as sites for septic tank absorption fields.

Low strength and the high shrink-swell potential are severe limitations on sites for roads and streets, and flooding is a severe hazard. Using a coarse-grained subgrade or base material and providing special construction for adequate support of the road will

prevent cracking and buckling, which are caused by low soil strength and high shrink-swell potential. Raising the roadbed will help control flooding.

This Openlake soil is in capability subclass IIIw.

Os—Openlake silty clay, occasionally flooded. This soil is deep, nearly level, and somewhat poorly drained. It is on the flood plain of the Mississippi River and is subject to occasional flooding, generally from February through April. In most areas, flooding duration is several days, but some low-lying areas are inundated for a few weeks. The mapped areas are long and broad and are roughly parallel to, but not adjacent to, present or old river channels. The mapped areas range from 5 to 300 acres. The slopes are dominantly 0 to 2 percent, but some short slopes are slightly steeper.

Typically, this soil has a surface layer of very dark grayish brown silty clay about 7 inches thick. The subsoil, to a depth of 68 inches, is dark grayish brown clay or silty clay. Mottles are in shades of brown and red. The faces of peds are coated with dark gray at a depth of more than 30 inches, or the matrix is dark gray in some pedons. The substratum to a depth of 75 inches is gray clay.

Included with this soil in mapping are small areas of Sharkey, Commerce, and Keyespoint soils. Sharkey soils are in lower positions on the landscape than Openlake soil or in depressional areas. These soils are poorly drained. Commerce and Keyespoint soils are intermingled with Openlake soil. Commerce soils have less than 35 percent clay, and Keyespoint soils are underlain by loamy textured layers at a depth of 20 to 40 inches. Also included are a few intermingled areas of a soil that is strongly acid in one or more layers between depths of 10 and 40 inches.

The permeability of this soil is very slow. The available water capacity is high. The content of organic matter is moderate, and the natural fertility is high. The soil reaction is strongly acid to mildly alkaline. Surface runoff is slow, and erosion is not a hazard. This soil has poor tilth and can only be worked within a narrow range of moisture content without forming very hard clods. A seasonal water table is at a depth of 1.5 to 3 feet during much of the winter and spring. The rooting depth is not limited during the growing season. The high water table can affect the roots of some perennial plants during the winter and spring. This soil has a high shrink-swell potential. It shrinks and cracks when dry and swells when wet.

Most areas of this soil are in row crops or woodland.

This Openlake soil is well suited to soybeans and grain sorghum because they are tolerant to wetness and can be planted late and harvested early. Optimum yields can be obtained without adding fertilizer or lime because of the high natural fertility of this soil. Additional applications of nitrogen are needed if cotton, corn, small grains, and summer annual grasses are grown. Soil tests should be used to determine fertilizer, lime, and nitrogen requirements and to obtain maximum yields. This soil is only moderately suited to crops, such as cotton or corn, that require early planting and a long growing season. Plowing the soil into ridges in the fall will help it dry out faster in the spring. This will save steps in seedbed preparation since the seeds can be planted directly into the ridges in the spring with little additional preparation. Even with this kind of preparation, the lower areas may still be too wet for early planting. Drainage ditches are helpful in removing excess surface water in low or depressional areas. Subsurface drainage systems are not effective because of the slow permeability of this soil.

This soil and several other clayey soils are sometimes locally referred to as "gumbo." The clayey surface layer is difficult to plow and hinders seedling emergence. It is critical that this soil be plowed at the correct moisture content to prepare a good seedbed. Large, extremely hard clods form when it is plowed when too wet or too dry. A compacted plowpan tends to form if the soil is worked over long periods with heavy equipment. The plowpan restricts root growth and water infiltration. Farming operations involving heavy equipment should be kept to a minimum or consolidated to help prevent or delay formation of a plowpan.

This soil is poorly suited to perennial pasture plants, hay, and small grains because of wetness and flooding. This soil is better suited to summer annual pasture grasses.

The potential of this soil for production of trees is high. Large areas are used for timber production. This soil is well suited to most bottom-land hardwood trees that are tolerant to wetness. American elm, sugarberry, pecan, cherrybark oak, and sweetgum are the dominant trees in the wooded areas. Wetness and flooding moderately restrict the use of equipment in managing and harvesting timber; therefore, operations involving heavy equipment should be done in dry periods. Seedling mortality is a moderate concern in management because of wetness and flooding.

Wetness and high shrink-swell potential are severe limitations affecting building site development and most other urban uses, and flooding is a severe hazard. Corrective measures to overcome these problems, especially flooding, generally are not feasible because of the high cost and some risk of damage to the

property after the measures are applied.

Because of the slow permeability, seasonal high water table, and flooding, this soil is not suitable as sites for septic tank absorption fields.

Low strength and the high shrink swell potential are limitations on sites for roads and streets, and flooding is a hazard. Using a coarse-grained subgrade or base material and providing special construction for adequate support of the road will prevent cracking and buckling, which are caused by low soil strength and high shrink-swell potential. Raising the roadbed will help control flooding.

This Openlake soil is in capability subclass IIIw.

Rb—Robinsonville fine sandy loam, occasionally flooded. This soil is deep, nearly level, and well drained. It is on natural levees on the Mississippi River flood plain. This soil generally is in higher positions on the flood plain and near present or old river channels. Most areas are subject to occasional flooding by the Mississippi River. A few higher areas are only rarely flooded. Flooding duration generally is a few days. The mapped areas range from 7 to 750 acres. The slopes are mostly long and smooth; but, in a few places, they are irregular in shape if recent flooding has scoured them. The slopes range from 0 to 3 percent.

Typically, this soil has a surface layer of brown fine sandy loam about 7 inches thick. The underlying material to a depth of 62 inches is made up of layers of brown, yellowish brown, dark yellowish brown, and dark grayish brown very fine sandy loam, loamy fine sand, and silt loam.

Included with this soil in mapping are some intermingled areas of Bruno soils. Bruno soils are sandier than Robinsonville soil, are excessively drained, and tend to be droughty. Also included is a soil in depressional areas that is moderately well drained or somewhat poorly drained and has layers of silty clay loam or silty clay in the underlying material. A few areas of soils are included that are along the banks of old stream channels and have short slopes of as much as 5 percent.

The permeability of this soil is moderate or moderately rapid. The available water capacity is high. The content of organic matter is low, and the natural fertility is high. The soil reaction is slightly acid to mildly alkaline. Surface runoff is slow, and erosion is not a hazard. This soil has excellent tilth and can be worked throughout a wide range of moisture content. A water table is at a depth of 4 to 6 feet, depending on the water level of the river in the winter and spring. The root zone is deep and easily penetrated by plant roots.

Most of the acreage of this soil has been cleared and is used for crops. A few areas are in woodland or pasture. Some areas are used for homesites.

This Robinsonville soil is well suited to a wide variety of crops. Commonly grown crops include soybeans, cotton, and corn. Other field crops that are not widely planted, such as grain sorghum, peanuts, and sunflowers, also grow well. This soil is well suited to many vegetable crops, including tomatoes. Crop production is limited mainly by the flooding hazard. Planting is delayed in some years because of flooding, but the soil dries out quickly after the water recedes. A considerable acreage of small grains, mainly wheat, is grown on this soil. Good yields are obtained in most years; however, flooding occasionally damages or destroys small grain crops.

The soil reaction is slightly acid to mildly alkaline; therefore, lime is generally not needed. This soil is naturally high in phosphorus and potassium, and most crops will show little or no response to the addition of these elements. Nonlegume crops respond well to the addition of nitrogen; however, split applications of nitrogen are more efficient because nitrogen leaches out rapidly. Soil tests should be used to determine fertilizer requirements on a specific field for a given crop. Leveling of irregular areas makes the soil easier to till with large equipment. Increasing the content of organic matter will improve the physical and chemical qualities of this soil.

This soil is well suited to pasture and hay production. Most perennial and annual grasses and legumes suited to the local climate will produce good yields of forage. This soil is well suited to alfalfa and will produce optimum yields. Forage production is limited mainly by flooding, which can cause stands of perennial grasses or legumes to die out and can delay growth and reduce forage yields in the spring.

This soil is well suited to the production of trees; however, only a few areas are in woodland. Most of these wooded areas are in the Anderson-Tully Wildlife Management Area. This soil is well suited to most trees that are tolerant to occasional flooding, and optimum yields of timber can be produced. American elm, sugarberry, pecan, sweetgum, American sycamore, and eastern cottonwood are the dominant trees in the wooded areas. Plant competition is the only significant concern in woodland management.

This soil is poorly suited to building site development because of the hazard of flooding. Flooding is easier to control on this soil than on most other soils on the Mississippi River flood plain because flooding generally occurs at a higher elevation and is less frequent.

Construction of farm buildings may be feasible in some places.

This soil is poorly suited as sites for roads and streets because of flooding. Raising the roadbed will help control flooding.

This Robinsonville soil is in capability subclass IIw.

Rc—Robinsonville silt loam, occasionally flooded. This soil is deep, nearly level, and well drained. It is on natural levees on the Mississippi River flood plain. This soil is in some of the higher positions on the flood plain and generally is in long areas between Robinsonville fine sandy loam and Commerce silt loam. Most areas are subject to occasional flooding by the Mississippi River. A few higher areas are only rarely flooded. Duration of flooding generally is a few days. The mapped areas range from 5 to 300 acres. The slopes are mostly long and smooth except for a few areas that have been dissected by recent flooding. The slopes range from 0 to 3 percent.

Typically, this soil has a surface layer of brown silt loam about 7 inches thick. The underlying material to a depth of 62 inches is stratified and is made up of layers of brown loam, yellowish brown very fine sandy loam, and dark brown silt loam.

Included with this soil in mapping are a few areas of Commerce soils that are in lower positions on the landscape than Robinsonville soil or are in depressional areas. Also included is a soil that is moderately well drained and has silty clay loam or silty clay layers in the underlying material.

The permeability of this soil is moderate or moderately rapid. The available water capacity is high. The content of organic matter is low, and the natural fertility is high. The soil reaction is slightly acid to mildly alkaline. Surface runoff is slow, and erosion is not a hazard. This soil has good tilth; however, it is not as easy to till as is Robinsonville fine sandy loam. A water table is at a depth of 4 to 6 feet, depending on the water level of the river in the winter and spring. The root zone is deep and is easily penetrated by plant roots.

Most of the acreage of this soil has been cleared and is used for crops. A few areas are in woodland and pasture, and a few areas are used for homesites.

This Robinsonville soil is well suited to a wide variety of crops. Most commonly grown row crops include soybeans, cotton, and corn. Other field and vegetable crops that are not widely grown, such as grain, sorghum, sunflowers, and tomatoes, produce high yields. This soil is not as well suited to root crops, such as peanuts, as Robinsonville fine sandy loam soil because the silt loam surface layer is not as friable and the soil clings to the roots more. Crop production is limited mainly by the flooding hazard, which delays planting in some years. Wheat is commonly planted on this soil, and good yields are obtained in most years; however, flooding can damage or destroy wheat or other small grain crops.

The soil reaction is slightly acid to mildly alkaline; therefore, lime is generally not needed. The soil is naturally high in phosphorus and potassium, and most crops will show little response to the addition of these elements. Nonlegume crops respond well to the addition of nitrogen. Soil tests should be used to determine fertilizer requirements on a specific area for a given crop.

This soil is well suited to pasture and hay production. Most perennial and annual grasses and legumes suited to the local climate will produce optimum yields of forage. This soil is well suited to alfalfa and will produce optimum yields. Forage production is limited mainly by flooding, which can cause stands of perennial grasses and legumes to die out and can delay growth and reduce forage yields in the spring.

This soil is well suited to the production of trees; however, only a few areas are in woodland. Most of the wooded areas are in the Anderson-Tully Wildlife Management Area. This soil is well suited to most trees that are tolerant to occasional flooding, and optimum yields of timber can be produced. American elm, sugarberry, sweetgum, American sycamore, and eastern cottonwood are the dominant trees in the wooded areas. Plant competition is the only significant concern in woodland management.

This soil is poorly suited to building sites because of the hazard of flooding. Flooding is easier to control on this soil than on most other soils on the Mississippi River flood plain because flooding generally occurs at a higher elevation and is less frequent. Construction of farm buildings may be feasible in some places.

This soil is poorly suited as sites for roads and streets because of flooding. Raising the roadbed will help control flooding.

This Robinsonville soil is in capability subclass IIw.

Rd—Robinsonville silty clay loam, overwash, occasionally flooded. This soil is deep, nearly level to undulating, and well drained. It is on the Mississippi River flood plain. This soil is on old, natural levees that are no longer adjacent to the present river channel. These areas currently receive deposits of a heavier textured alluvium that range from 4 to 12 inches in thickness. This soil is subject to flooding by the

Mississippi River, mainly from February through April. Duration of flooding generally is several days, but severe flooding can inundate the area for longer periods depending on the position of the soil on the landscape. The mapped areas range from 5 to 180 acres. The slopes vary in shape. Some are long and smooth, and some are short and irregular in shape and are cut by sloughs and channels. The slopes range from 0 to 3 percent.

Typically, this soil has a surface layer of dark grayish brown silty clay loam about 8 inches thick. The underlying material to a depth of 62 inches is made up of layers of brown and yellowish brown very fine sandy loam, loamy fine sand, and silt loam.

Included with this soil in mapping are a few intermingled areas of soils that have a silty clay surface layer or a silt loam surface layer. Also included are some intermingled areas of soils that have strata that range from silty clay to loamy sand.

The permeability of this soil is moderate in the surface layer and moderate or moderately rapid in the substratum. The available water capacity is high. The content of organic matter is low, and the natural fertility is high. The soil reaction is slightly acid to mildly alkaline. Surface runoff is slow, and erosion is not a hazard except in some of the more sloping areas. This soil does not have good tilth, and a good seedbed is difficult to prepare. A water table is at a depth of 4 to 6 feet, depending on the water level of the river in the winter and spring. The rooting depth generally is not limited. The root zone is deep and is easily penetrated by plant roots.

Most of the acreage of this soil on Flower Island and the islands west of the Mississippi River is used as woodland. Some acreage has been cleared and is used for row crops, mainly soybeans.

This Robinsonville soil is suited to a wide variety of crops. Soybeans, cotton, and corn are the most commonly grown. This soil is well suited to these crops and to many other vegetable crops and field crops, and optimum yields can be obtained in most years. This soil is poorly suited to root crops, such as peanuts, because of the heavy surface texture. Poor tilth is the major limitation affecting crop production, and flooding is a hazard that delays planting in some years, limiting selection of crops that can be grown. Wheat grows well on this soil in most years; however, flooding can damage the wheat crop in the winter and spring.

The soil reaction is slightly acid to mildly alkaline; therefore, lime is not needed. This soil is naturally high in phosphorus and potassium, and most crops will show little response to the addition of these elements. Nonlegume plants will respond well to the addition of nitrogen. Soil tests should be used to determine fertilizer requirements in a specific area for a given crop.

This soil is well suited to pasture and hay production. Most perennial and annual grasses and legumes will produce optimum yields of forage. This soil is well suited to alfalfa. Forage production is limited mainly by flooding, which can damage stands and delay growth in the spring.

This soil is well suited to the production of trees, especially those that are tolerant to occasional flooding. Eastern cottonwood, sweetgum, sugarberry, American elm, and American sycamore are the dominant trees in the wooded areas. Competing vegetation, which can crowd out or stunt the growth of seedlings of desirable trees, is a problem in open areas and must be controlled to increase the growth of desirable trees. Dense growth of vines also damages standing timber in places. Wetness and flooding restrict the use of heavy equipment.

This soil is poorly suited to building sites because of the hazard of flooding. Corrective measures to help control flooding generally are not feasible because of the high cost and high risk of damage to property.

This soil is poorly suited as sites for septic tank absorption fields because of flooding.

This soil is poorly suited as sites for roads and streets because of flooding. Raising the roadbed will help control flooding.

This Robinsonville soil is in capability subclass IIw.

Ro—Rosebloom silt loam, frequently flooded. This soil is deep, nearly level, and poorly drained. It formed in silty alluvium. Most areas of this soil are in slack-water areas on the Forked Deer River flood plain, and a few areas are in depressions on the Hatchie River flood plain. This soil is subject to flooding, generally from December through May in most years, but flooding can occur at almost any time. Flooding duration mostly is for several days, but some low-lying areas are inundated for longer periods. The mapped areas range from 5 to 400 acres. The slopes are 0 to 2 percent.

Typically, this soil has a surface layer of brown silt loam about 5 inches thick. The subsoil to a depth of 72 inches is made up of layers of dark gray and gray silty clay loam and silt loam that is mottled in shades of brown and red.

Included with this soil in mapping are a few areas of Arkabutla and Convent soils. These soils are in slightly higher positions on the landscape than Rosebloom soil and are somewhat poorly drained. Also included are a

few intermingled areas of a soil that has a layer of silty clay in the subsoil, and a few areas of a soil that has subhorizons that range from medium acid to neutral.

The permeability of this soil is moderate. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid or very strongly acid except where lime has been added. Surface runoff is very slow, and erosion is not a hazard. This soil has moderately good tilth, but it dries out slowly in the spring, which often makes tilling difficult and causes cloddiness. The water table is at or near the surface during most of the winter and early in the spring. It is at a depth of 3 to 6 feet during the summer and fall. The effective rooting depth is affected by, and corresponds to, the depth to the water table, especially for plants that are sensitive to wetness.

Most areas of this soil are used for row crops or woodland. Many areas used for row crops have some type of artificial drainage system and levee system for protection from flooding.

Generally, the suitability of this Rosebloom soil for crops depends on the amount of drainage and protection from flooding that is provided. Without any flooding protection or drainage system, this soil is poorly suited to row crops and pasture. When good drainage and levee systems are used, this soil is moderately suited to crops, such as soybeans and grain sorghum, that are tolerant to wetness and can be planted later in the growing season. Optimum yields of these crops can be obtained most years if fertility and pH are maintained at optimum levels and proper management practices are used. Yields will be reduced in years of excessive wetness even with a good drainage system and protection from flooding. Because of wetness and flooding early or late in the growing season, this soil is poorly suited to cotton, corn, and small grains, even in areas where a drainage system is in use. Open ditches, levees, pumping systems, and land leveling are practices that are commonly used to overcome wetness and flooding. Subsurface drainage generally is not effective because of the frequency and duration of flooding. Regulations concerning drainage should be checked before any new drainage work is considered.

This soil is poorly suited to hay crops and pasture. It is moderately suited to fescue and bermudagrass if adequate drainage and levee systems are installed and maintained; however, the economic return from pastures generally is not enough to justify using the land for pasture rather than for row crops.

The areas of this soil that are in woodland generally are about 10 to 100 acres, and most are in undrained areas that are too wet to farm. This soil is moderately suited to timber production, and bottom-land hardwoods that are tolerant to wet conditions produce optimum yields. Baldcypress, willow oak, water oak, sweetgum, green ash, tupelo gum, and various wetland oaks are the dominant trees in the wooded areas. Because of wetness and flooding, the use of equipment and seeding mortality are severe concerns in woodland management; therefore, operations involving heavy equipment are best done in the summer and fall. Ponding in some low areas for a month or longer and siltation around tree trunks have killed stands of timber in a few areas. Measures to remove the ponded water and prevent further siltation sometimes will inhibit further damage to timber.

Wetness is a severe limitation on building sites, and flooding is a hazard. Corrective measures to overcome these problems generally are not feasible because of the extremely high cost and some risk of damage to the property after the measures are applied.

This soil is not suitable as sites for septic tank absorption fields because of flooding and the high water table.

Because of low strength and flooding, this soil is poorly suited as sites for roads and streets. The use of a coarse-grained subgrade or base material will prevent buckling and cracking, which are caused by low soil strength. Raising the roadbed to help control flooding can be a feasible solution to these problems in a few places.

This Rosebloom soil is in capability subclass Vw.

Rt—Routon silt loam. This soil is deep, nearly level, and poorly drained. It is on flats and divides and around drainage heads on loess-covered uplands and on low, flat terraces near major streams. Severe flooding can inundate a few lower areas adjacent to streams for brief periods. The mapped areas range from 5 to 125 acres. The slopes are long and flat to slightly concave and range from 0 to 2 percent.

Typically, this soil has a surface layer of brown silt loam 7 inches thick. The subsurface layer, to a depth of 15 inches, is light brownish gray silt loam. The subsoil, to a depth of 56 inches, is light brownish gray silty clay loam and silt loam mottled in shades of brown. The substratum to a depth of about 72 inches is grayish brown silt loam mottled in shades of brown or is brown mottled in shades of gray.

Included with this soil in mapping are some small areas of Center soils and a few intermingled areas of Dekoven soils. Center soils are in higher positions on

Figure 12.—Poor stands of cotton are common on Routon silt loam because of the cold, wet conditions of this soil in the spring.

the landscape than Routon soil and are somewhat poorly drained. Dekoven soils are a darker color than Routon soils. Also included, adjacent to steeper slopes, are a few areas of soils that have a layer of brown silt loam overwash deposition that is as much as 20 inches thick.

The permeability of this soil is slow. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid to slightly acid in the surface layer and upper part of the subsoil and is medium acid to neutral in the lower part of the subsoil and in the substratum. Surface runoff is slow, and erosion is not a hazard. This soil has good tilth. A high water table is at a depth of less than 1 foot during wet periods in the winter and early in the spring. The rooting depth generally is not limited during the growing season. The seasonal high water table can limit root growth of some perennial plants that are sensitive to wetness.

Most areas of this soil are used for cultivated crops. A few small scattered areas are used as pasture or woodland. This soil is sometimes called "white ground" or "buckshot land" because of the light color of the surface and the iron and manganese nodules in the soil.

This Routon soil is moderately suited to crops that are tolerant to wetness, which is the main limitation affecting crop production. This soil is slow to dry out in the spring, and tillage and planting are delayed in some years. Even when seeds can be planted early, poor stands often result because this soil is cold and wet and tends to crust (fig. 12). In most years, this soil is poorly suited to crops, such as cotton and corn, that must be planted early in the growing season. Excessive wetness in the summer or excessive applications of nitrogen will cause cotton to grow too tall and rank and to mature

late. Planting row crops on beds or ridges will help this soil dry out and warm up faster in the spring. This soil is moderately suited to small grains; however, crops can be damaged or planting can be delayed in some years because of wetness or ponding in the winter and spring. Drainage ditches and land leveling will reduce ponding and wetness.

This soil is moderately suited to pasture and hay production. Tall fescue or bermudagrass, in combination with white clover is commonly grown. Summer annual grasses also produce optimum yields of forage. Management practices, such as using drainage ditches to prevent ponding, controlling grazing, and maintaining the pH and soil fertility at proper levels, will help produce maximum yields and extend the life of the pastures. This soil is poorly suited to alfalfa because of the high water table.

This soil is well suited to timber production; however, only a few small isolated woodlots are now in woodland. Willow oak, water oak, and sweetgum are dominant trees in the wooded areas. Woodland management operations involving heavy equipment are easier to accomplish in the summer and fall because of wetness in the winter and spring. Controlling competing vegetation around seedlings will allow them to become established and increase their rate of growth.

This soil is poorly suited to building sites because of wetness. Sealing the foundation, using subsurface drainage around the foundation, and installing diversions and ditches around the building site will help overcome the wetness limitations.

This soil is poorly suited as sites for septic tank absorption fields because of slow percolation and the high water table.

Low strength and wetness are the main limitations on sites for local roads and streets. The use of a coarse-grained subgrade or base material will help prevent cracking and buckling, which are caused by low soil strength. An adequate drainage system and sloping of the roadbed will help overcome the wetness limitation.

This Routon soil is in capability subclass IIIw.

Ru—Routon silt loam, occasionally flooded. This soil is deep, nearly level, and poorly drained. It is on low terraces adjacent to the Hatchie River flood plain. Most areas of this soil are in slightly higher positions than the Hatchie River flood plain and are not flooded as often, or for as long, as the flood plain. Severe flooding can inundate many areas for several days. The lower areas remain flooded for longer periods. Ponded depressional areas are common. The mapped areas range from 5 to 225 acres. The slopes are long and flat to concave and range from 0 to 2 percent.

Typically, this soil has a surface layer of brown silt loam about 7 inches thick. The subsurface layer, to a depth of 15 inches, is light brownish gray silt loam that has mottles in shades of brown. The subsoil, to a depth of 56 inches, is light brownish gray silt loam and silty clay loam that has mottles in shades of brown. The substratum to a depth of 72 inches or more is grayish brown silt loam that has mottles in shades of brown or is brown mottled in shades of gray.

Included with this soil in mapping are a few areas of Askew soils that are in higher positions on the landscape than Routon soil and are moderately well drained. Also included are a few areas of soils that have a layer of recent silty overwash deposition on the surface. These soils are mostly in the lower areas where water ponds.

The permeability of this soil is slow. The available water capacity is high. The content of organic matter is low, and the natural fertility is medium. The soil reaction is strongly acid to slightly acid in the surface layer and upper part of the subsoil and is medium acid to neutral in the lower part of the subsoil and in the substratum. Surface runoff is slow, and erosion is not a hazard. Generally this soil has good tilth but tillage operations can be delayed by wetness in the spring. A high water table is at a depth of less than 1 foot at times during the winter and early in the spring. This high water table can limit root growth of some perennial plants.

Most areas of this soil have been cleared and are used for cultivated crops. Some areas are in woodland and a few areas are used for pasture. This soil is sometimes called "white ground" or "buckshot land" because of the light color of the surface and the iron and manganese nodules in the soil.

This Routon soil is moderately suited to soybeans and other crops that are tolerant to wetness and that can be planted late in the growing season. This soil is subject to flooding in the winter and spring, and it is slow to dry out and warm up in the spring even in years when flooding does not occur. These conditions delay tillage and planting in the spring. Even when seeds can be planted early, poor stands often result because this soil is cold and wet and tends to crust over. This soil is poorly suited to crops such as cotton and corn that must be planted early in the growing season, especially in wet years. Wetness in the summer or too much nitrogen fertilizer will cause cotton to grow excessively tall and rank and to mature late. Planting row crops on beds or ridges will help this soil dry out and warm up faster in the spring. This soil is poorly suited to small grains because of wetness and flooding in the winter

and spring. Optimum yields of small grains can be produced in some years, but serious crop damage can occur in wet years. Drainage ditches and land leveling will help reduce ponding and wetness.

This soil is moderately suited to perennial forage crops, but these crops can be damaged or planting can be delayed because of flooding and standing water. This soil is better suited to perennial pasture plants that are tolerant to wetness and to summer annual forage crops. It is poorly suited to alfalfa because of flooding and wetness.

This soil is well suited to the production of trees, and optimum yields of timber can be produced. The woodland is small areas of this soil that is included in other map units. Willow oak, water oak, and various wetland oaks are the dominant trees in the wooded areas. The use of heavy equipment in managing and harvesting timber is limited to the drier months because of wetness and flooding in the winter and spring. Competing vegetation can crowd out or stunt the growth of seedlings of desirable trees in cutover areas. Controlling competing vegetation will allow seedlings to become established and increase their rate of growth.

Wetness is a severe limitation on building sites, and flooding is a severe hazard. Corrective measures to control flooding generally are not feasible because of the high cost and some risk of damage to the property after the measures are applied. Shaping the site and installing drains and ditches will help overcome the excess wetness limitation.

This soil is not suited as sites for septic tank absorption fields because of flooding, wetness, and slow percolation.

This soil is poorly suited as sites for roads and streets because of flooding, wetness and low soil strength. Raising the roadbed and installing good drainage ditches will help overcome the flooding and wetness problems. Using a coarse-grained subgrade or base material and reinforcing the road bed will prevent cracking, which is caused by low soil strength.

This Routon soil is in capability subclass IIIw.

Sh—Sharkey clay, frequently flooded. This soil is deep, nearly level, and poorly drained. It formed in clayey deposits in broad, flat slack-water areas on the Mississippi River flood plain. This soil is flooded almost annually by the Mississippi River, generally from January through May. Flooding duration in most areas is several days, but some areas are inundated for longer periods. Some old channels and sloughs hold water almost year-round. The mapped areas range from 5 to 1,250 acres. The slopes are flat with common depressional areas. They range from 0 to 2 percent.

Typically, this soil has a surface layer of very dark grayish brown clay about 5 inches thick. The subsoil to a depth of 60 inches is dark gray and gray clay. Mottles are in shades of brown and red.

Included with this soil in mapping are a few intermingled areas of Tunica soils and some areas of Openlake soils. Tunica soils are underlain by loamy textured layers at a depth of 20 to 40 inches. Openlake soils are somewhat poorly drained.

The permeability of this soil is very slow. The available water capacity is moderate. The content of organic matter is moderate, and the natural fertility is high. The soil reaction is medium acid to mildly alkaline. Surface runoff is very slow, and erosion is not a hazard. This soil has very poor tilth. It is sticky and plastic when wet and very hard when dry. A water table is within 2 feet of the surface during the winter and spring and, in some years, until early in the summer. The plant rooting depth, especially for perennial plants, is limited by the high water table. This soil has a high shrink-swell potential (fig. 13).

More than half of the acreage of this soil is used as woodland. Most of the remaining acreage is in row crops, mostly soybeans.

This Sharkey soil is poorly suited to most row crops and small grains because of flooding and wetness. In most years, flooding delays planting in the spring and sometimes interferes with harvesting in the fall. Soybeans and grain sorghum are the only crops that can be grown consistently. Yields of these crops are often reduced because of flooding and wetness. The addition of fertilizer or lime is generally not needed for soybeans because this soil is naturally high in phosphorus and potassium and the pH level is generally within a favorable range. Additional nitrogen is needed for grain sorghum. Soil tests should be used to determine the need of the crops for fertilizer and lime in questionable situations. Drainage ditches are necessary to remove ponded water after the floodwater recedes. Land leveling will also help prevent ponding. Subsurface drainage does not work well because of slow percolation and flooding and because suitable drainage outlets are not available.

Poor tilth is a serious problem because of the clayey texture of this soil, which is referred to locally as "gumbo." This soil is not easily tilled, and a good seedbed is difficult to prepare. Large, extremely hard clods form if it is plowed when too wet or too dry. Seedling emergence is also restricted because of the heavy textured surface. Plowing the soil into ridges or beds in the fall helps the soil dry out faster in the

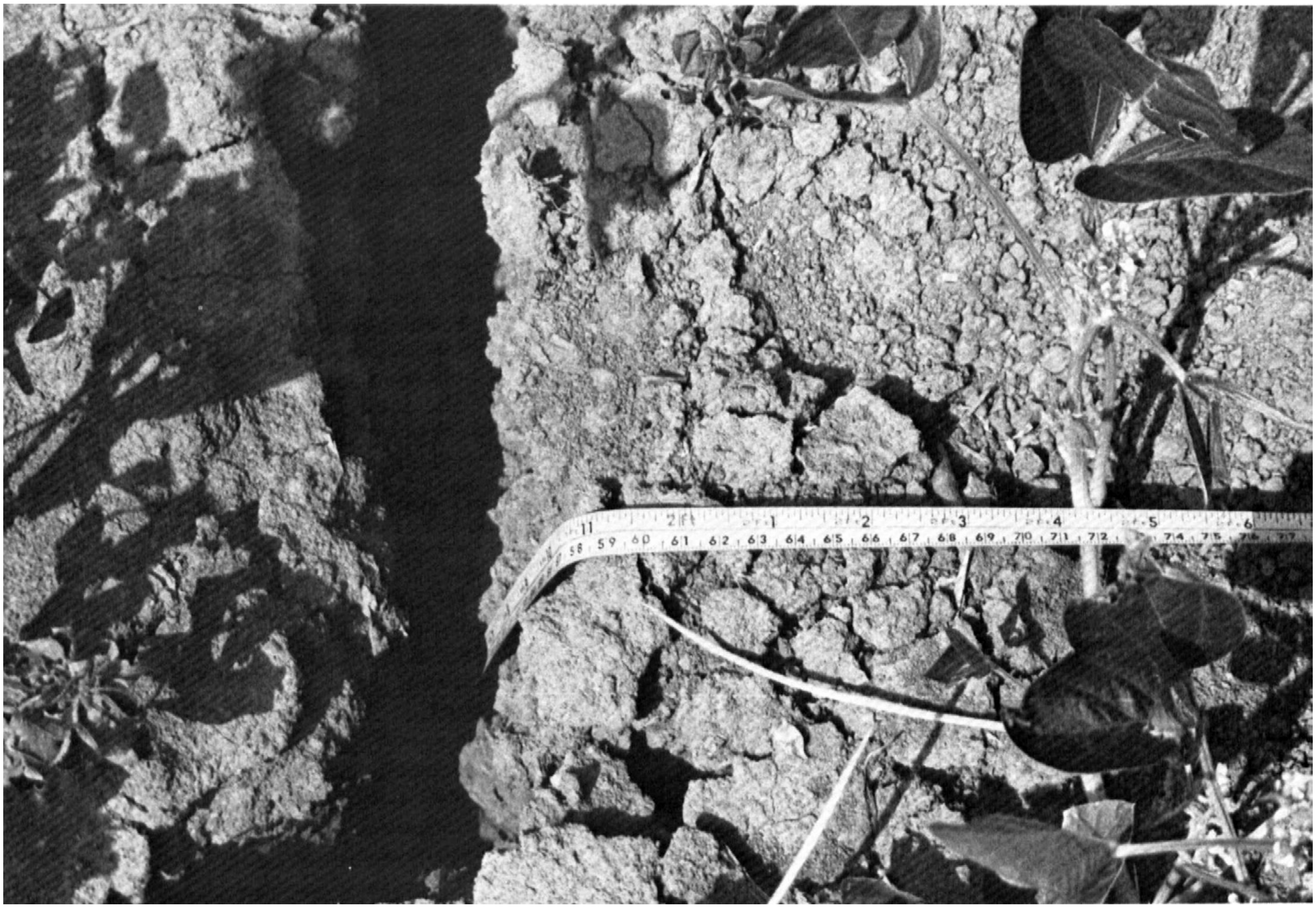


Figure 13.—Sharkey clay, frequently flooded, has a high shrink-swell potential, which causes deep, wide cracks to develop when the soil dries.

spring; however, prolonged flooding can wash the ridges down. Plowpan formation is also a problem. Farming operations should be limited or consolidated, especially under wet conditions, to reduce the formation of a plowpan.

This soil is poorly suited to pasture and hay production because of flooding and wetness. Bermudagrass or other grasses that are tolerant to wetness will produce some forage, but spring growth is delayed and stands are weakened by flooding. This soil is better suited to summer annual grasses. Pasture plants respond well to applications of nitrogen.

Trees that are adapted to very wet conditions and periodic standing water grow well on this soil. Under natural conditions, timber production is probably the most practical use of this soil. Most wooded areas are in the Anderson-Tully Wildlife Management Area and around Sunk Lake. Eastern cottonwood, baldcypress, sweetgum, and various wetland oaks and hickories are the dominant trees in the wooded areas. The use of equipment in managing and harvesting timber on this soil is limited to the summer and fall because of wetness and flooding in the winter and spring. Seedling mortality is a concern in management when planting or restocking woodlands because of flooding and wetness. Selecting trees that are suited to wet conditions and planting the seedlings in time for them to become established before flooding occurs will help them survive and increase their rate of growth.

Wetness and the high shrink-swell potential are severe limitations on building sites, and flooding is a severe hazard. Corrective measures to overcome these

problems are so difficult and expensive to install and maintain that they generally are not feasible; and also, there is always some risk of damage to property after the measures are applied.

Because of the slow percolation, flooding, and a high water table, this soil is not suitable as sites for septic tank absorption fields.

Because of low strength, flooding, and high shrink-swell potential, this soil is poorly suited as sites for roads and streets. The use of a coarse-grained subgrade or base material and special construction for adequate support of the road will prevent cracking and buckling, which are caused by low strength and shrinking and swelling of the soil. Raising the roadbed will help control flooding. An alternate site should be considered.

This Sharkey soil is in capability subclass Vw.

Tu—Tunica clay, frequently flooded. This soil is deep, nearly level, and poorly drained. It formed in beds of clayey alluvium over loamy alluvium in broad, flat, slack-water areas on the Mississippi River. It is subject to flooding at least once a year by the Mississippi River, generally from January through May. Flooding duration in most areas is for several days, but some low areas are inundated for weeks. The mapped areas range from 5 to 375 acres. The slopes generally are flat with occasional low, wide ridges and range from 0 to 2 percent.

Typically, this soil has a surface layer of dark grayish brown clay about 4 inches thick. The subsoil, to a depth of 30 inches, is dark gray clay mottled in shades of brown. The upper part of the substratum, to a depth of 40 inches, is mottled grayish brown, dark yellowish brown, and yellowish brown silt loam. The lower part to a depth of 60 inches is grayish brown loam mottled in shades of brown.

Included with this soil in mapping are a few intermingled areas of Sharkey soils and a few areas of Keyespoint and Bowdre soils. Sharkey soils have clay texture to a depth of more than 40 inches. Keyespoint and Bowdre soils are in slightly higher positions on the landscape than Tunica soils and are somewhat poorly drained.

The permeability of this soil is very slow. The available water capacity is moderate or high. The content of organic matter is moderate, and the natural fertility is high. The soil reaction is medium acid to mildly alkaline. Surface runoff is slow, and erosion is not a hazard. This soil has very good tilth. It is sticky and plastic when wet and very hard when dry. A water table is within 1.5 to 3 feet of the surface during most of the winter and spring and, in some years, until early in the summer. The plant rooting depth, especially for perennial plants, is limited by the high water table. This soil has a high shrink-swell potential.

More than half of the acreage of this soil is used as woodland. Most of the remaining acreage is used for row crops, mostly soybeans.

This Tunica soil is poorly suited to most row crops and small grains because of flooding and wetness. In most years, flooding delays planting in the spring and sometimes interferes with harvesting in the fall. Soybeans and grain sorghum are the only crops that can be grown consistently. Yields of these crops are often reduced because of flooding and wetness. The addition of fertilizer and lime is generally not needed for soybeans because this soil is naturally high in phosphorus and potassium and the pH level is within a favorable range. Additional nitrogen is needed for grain sorghum. Soil tests should be used to determine the need of the crops for fertilizer or lime in questionable situations. Drainage ditches help prevent ponding. Subsurface drainage does not work well because of slow permeability and flooding and because suitable drainage outlets are not available.

Poor tilth is a serious problem because of the clayey texture of this soil. This texture is commonly referred to locally as "gumbo." This soil is not easily tilled, and a good seedbed is difficult to prepare. Large, extremely hard clods form if the soil is plowed when too wet or too dry. Seedling emergence is also restricted because of the heavy textured surface, which often results in poor stands. Plowing the soil into ridges or beds in the fall helps it to dry out faster in the spring; however, prolonged flooding can wash the ridges down. Plowpan formation is also a problem on this soil. Farming operations should be limited or consolidated, especially under wet conditions, to reduce the formation of a plowpan.

This soil is poorly suited to pasture and hay production because of flooding and wetness. Bermudagrasses or other grasses that are tolerant to wetness will produce moderate yields of forage, but spring growth can be delayed and stands weakened because of flooding. This soil is better suited to summer annual grasses. Pasture plants respond well to applications of nitrogen.

Trees that are suited to very wet conditions grow well on this soil. Under natural conditions, timber production is probably the most practical use of this soil. Most wooded areas are in the Anderson-Tully Wildlife Management Area. Eastern cottonwood, baldcypress, sweetgum, and various wetland oaks are the dominant

trees in the wooded areas. The use of equipment in managing and harvesting timber on this soil is limited to the summer and fall because of wetness and flooding in the winter and spring. Seedling mortality is a concern in management when planting or restocking woodlands because of flooding and wetness. Selecting trees that are suited to wet conditions, and planting seedlings in time for them to become established before flooding occurs will help them survive and will increase their rate of growth.

Wetness and the high shrink-swell potential are severe limitations on building sites, and flooding is a severe hazard. Corrective measures to overcome these problems are so difficult and expensive to install and maintain that they generally are not feasible; and also, there is always some risk of damage to property after the measures are applied.

Because of the slow percolation, flooding, and high water table, this soil is not suitable as sites for septic tank absorption fields.

Because of low strength, flooding, and high shrink-swell potential, this soil is poorly suited as sites for roads and streets. The use of a coarse-grained subgrade or base material and special construction for adequate support of the road will prevent cracking and buckling, which are caused by low soil strength and shrinking and swelling. Raising the roadbed will help control flooding. An alternate site should be considered.

This Tunica soil is in capability subclass Vw.

UD—Udults, sloping. This soil is sloping and well drained. It is on foot slopes extending from the base of the loess bluff. The mapped areas range from 10 to 50 acres. The slopes vary in length and shape and range from 5 to 12 percent.

In a representative area, Udults has a surface layer of brown sandy loam. The subsoil, to a depth of about 50 inches, is yellowish brown or strong brown sandy loam, loam, or clay loam. The substratum is yellowish brown sandy loam.

Included with this soil in mapping are a few intermingled areas of Memphis soils, and a few areas of soils that have a sandier texture than Udults.

The permeability of this soil is moderate. The available water capacity is moderate or high. The natural fertility is low, and the content of organic matter is low. The soil reaction ranges from very strongly acid to medium acid. Surface runoff is rapid, and the hazard of erosion is severe. This soil has good tilth. There is no water table, but a few areas near the bottoms of slopes have wet seep spots. The root zone is deep.

Most of the acreage of this soil has been cleared and is used for crops. Some of the acreage is in woodland, and some is used for pasture.

This soil is poorly suited to most row crops because of the erosion hazard and the limited available water capacity. Erosion control practices will help reduce erosion. In years that have adequate rainfall throughout the growing season, optimum yields can be obtained, but yields are greatly reduced in drier years. This soil is better suited to drought-tolerant crops, but it is moderately suited to small grains. Rainfall in most years is received during the months in which small grains are growing. Generally, fertilizer and lime are needed to produce optimum yields and should be applied according to soil test recommendations.

This soil is moderately suited to pasture and hay production. Forage production is limited mainly by the limited available water capacity and the erosion hazard. Maintaining proper levels of pH and soil fertility according to soil tests, controlling weeds, controlling grazing, and renovating or periodically reestablishing pastures will ensure adequate ground cover and maximum yields. A good stand of grasses or legumes can be difficult to obtain because of the sandy loam surface layer. This soil is well suited to most legumes and grasses, including alfalfa, that are commonly grown in the area.

This soil is well suited to the production of trees. Oaks, hickories, sweetgum, yellow poplar, and sugar maple are the dominant trees in the wooded areas. The limited available water capacity affects productivity. The erosion hazard and plant competition are the main concerns in management. Controlling competing vegetation around seedlings and young trees will allow them to become established and increase their rate of growth.

Slope is a moderate limitation on building sites. Conforming to the natural slope or shaping the site to accommodate the building will help overcome this limitation.

Slope is a moderate limitation on sites for septic tank absorption fields. Land shaping, installing the field lines across the slope, or installing the field lines in an area of an included soil that is less steeply sloping will help overcome the slope limitation.

Low strength is the main limitation on sites for local roads and streets. This soil is soft when wet, which causes the pavement to crack under heavy traffic. The use of a coarse-grained subgrade on base material will prevent damage caused by low soil strength.

This Udults soil is in capability subclass IVe.

UO—Udults and Udorthents, very steep. These soils are deep, very steep, and well drained and excessively drained. They are on lower parts of the loess bluff. These areas are highly dissected with complex slope patterns. The mapped areas are in scattered locations on the bluff and are long and narrow. These areas generally are on the bottom third or half of the bluff, and Memphis soil is on the top part of the bluff. The mapped areas are 5 to 200 acres. The slopes are dominantly 20 to 60 percent. In a few areas on foot slopes, the slopes are less than 20 percent.

The composition of each area varies considerably but averages about 45 percent Udults, 30 percent Udorthents, and 25 percent of other similar soils. Udults and Udorthents were mapped together because they could not be separated in many areas, and use and management are similar. Steepness of slope is the overriding limitation of this map unit.

In a representative area, Udults has a surface layer of very dark grayish brown gravelly silt loam about 3 inches thick. The subsurface layer, to a depth of 10 inches, is brown gravelly loam. The upper part of the subsoil, to a depth of 20 inches, is strong brown gravelly loam. The middle part, to a depth of 27 inches, is brown clay loam. The lower part, to a depth of 51 inches, is brown sandy clay loam. The substratum to a depth of 65 inches is brown loamy sand.

In a representative area, Udorthents has a surface layer of very dark grayish brown loam about 3 inches thick. The subsoil, to a depth of 15 inches, is yellowish brown gravelly sandy loam. The substratum to a depth of 72 inches is brownish yellow sand that has a few mottles in shades of brown and has bodies of sandy loam.

Included with this soil in mapping are some intermingled areas of Memphis soils. Also included are some intermingled areas of unnamed soils that have a clay subsoil or substratum, and some areas of soils along drainageways in which the ironstone outcrops are exposed.

The permeability is moderate in Udults and rapid in Udorthents. The available water capacity is moderate or high in Udults and low in Udorthents. The content of organic matter is low, and the natural fertility is low. The soil reaction ranges from very strongly acid to medium acid. Surface runoff is very rapid, but erosion is not a severe hazard. These soils have good tilth, but they are too steep to cultivate. The root zone is deep. There is no seasonal high water table within the upper 6 feet of the surface.

Most areas of these soils are used as woodland. A few less steep areas on the foot slopes have been cleared and used for pasture or crops. Some areas have been mined for sand or gravel.

These soils are poorly suited to row crops and pasture because of steep slopes and low or medium available water capacity. The steep, highly dissected slopes make farming equipment difficult or dangerous to use; and once the slopes are cleared, uncontrollable erosion will result. The limited available water capacity severely restricts the use of these soils for pasture plants.

These soils are only moderately suited to the production of trees because of the steep slopes and limited available water capacity. American beech, eastern redcedar, and various oaks and hickories are the common trees in the wooded areas. Areas of Udults have better available water capacity than Udorthents, but the soils in this map unit are too intermingled to manage separately. Areas of these soils that are near the base of the bluff where ground water seeps to the surface also produce better timber, but these areas occur irregularly. The low available water capacity also contributes to seedling mortality. Heavy equipment is difficult to use on the steep, irregular slopes. Removing the vegetation cover from the surface during logging operations can also cause erosion, which leads to formation of large gullies.

These soils are poorly suited to building sites because of the steep slopes. Measures required to build on slopes this steep would be extremely costly, and gullies and slumping are likely to occur if this soil is disturbed.

These soils are poorly suited as sites for septic tank absorption fields because of the steep slopes and sandy texture. The steep slopes make installation difficult and could allow seepage downslope. Contamination of the ground water is a danger because of the poor filtering capacity of the sandy textured soils.

These soils are poorly suited as sites for roads and streets because of the steep slopes. Designing and constructing the roadbed would be difficult and costly, and once constructed, the roadbed would be unstable and difficult to maintain.

The soils in this map unit are in capability subclass VIIe.

Prime Farmland

In this section, prime farmland is defined and discussed, and the prime farmland soils in Lauderdale County are listed in table 5.

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, state, and federal levels, as well as individuals, must encourage and facilitate the wise use of our nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to producing food, feed, forage, fiber, and oilseed crops. Such soils have properties that are favorable for the economic production of sustained high yields of crops. The soils need only to be treated and managed using acceptable farming methods. The moisture supply, of course, must be adequate, and the growing season has to be sufficiently long. Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources. Farming these soils results in the least damage to the environment.

Prime farmland soils may presently be in use as cropland, pasture, or woodland, or they may be in other uses. They are used for producing food or fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water control structures. Public land is land not available for farming in national forests, national parks, military reservations, and state parks.

Prime farmland soils usually get an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods and are not subject to frequent flooding during the growing season. The slope ranges mainly from 0 to 5 percent.

About 154,038 acres, or 50.5 percent, of the soils in Lauderdale County meets the requirements for prime farmland. Areas of prime farmland are throughout the county. The largest areas of prime farmland are on the bottom lands along the Mississippi River, mainly in general soil map units 1, 2, and 3. Most of the soils in these map units meet the requirements for prime farmland except for those soils that are too sandy and those that are frequently flooded during the growing season. Other fairly large areas are on the bottom lands along creeks in general soil map unit 9. Prime farmland areas are smaller and more scattered in general soil map units 4, 5, and 6. Prime farmland in these map units consists of soils on the uplands that have slopes of 5 percent or less and are not severely eroded and of bottom land soils that are not frequently flooded. Most of the soils in general soil map units 7 and 8 are not prime farmland because of frequent flooding during the growing season. In these map units, only soils that are not frequently flooded meet the requirements for prime farmland.

In recent years, the trend in land use in Lauderdale County has resulted in the reduction of prime farmland because of soil erosion and the loss of some prime farmland to urban and industrial uses and to rural industrial development. Many of the uneroded or moderately eroded soils in the county have become severely eroded and are no longer classified as prime farmland. Bank erosion along the Mississippi River has also resulted in the loss of prime farmland in a few areas. The loss of prime farmland for any reason puts more pressure on marginal lands, which generally are more steep, more erodible, more wet or more droughty, and generally less productive.

The map units, or soils, that make up prime farmland

in Lauderdale County are listed in table 5. The location of each map unit is shown on the detailed soil maps at the back of this publication. The extent of each unit is given in table 4. The soil qualities that affect use and management are described in the section "Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Soils that have limitations, such as a high water table or flooding, may qualify as prime farmland if these limitations are overcome by such measures as drainage or flood control. In the following list, the measures needed to overcome the limitations of a map unit, if any, are shown in parentheses after the map unit name. Onsite evaluation is necessary to determine if the limitations have been overcome by the corrective measures.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern that is in harmony with nature.

Contractors can use this survey to locate potential sources of sand, roadfill, and topsoil. They can use it to identify areas where wetness or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs *(3)*.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

According to the Tennessee Crop Reporting Service, 182,300 acres of crops was planted in Lauderdale County in 1984, and an estimated 26,975 acres was in pasture and hayland. Of the total acreage of crops, 121,000 acres of soybeans; 33,000 acres of wheat; 13,500 acres of grain sorghum; 3,000 acres of corn; and 11,800 acres of cotton were planted in 1984. Fruits, vegetables, and other crops were grown on about 3,000 acres. Much of the winter wheat was double cropped with soybeans. The 26,975 acres in pasture and hayland consisted mainly of tall fescue and common bermudagrass. Much of the improved pasture contains white clover or other legumes. Summer annual grasses for hay and grazing are grown in a few places. A small but increasing acreage of alfalfa is grown for hay. Winter wheat is grown primarily for grain and is grazed late in winter and in spring on a few farms.

The acreage of soybeans and wheat increased for several years until it peaked in about 1979 or 1980. Since then, the acreage of these crops and that of corn has been declining slightly. The acreage of grain sorghum has been increasing the last few years. Within the past 20 years, a fairly large acreage of pasture has been plowed up and planted to soybeans and other grain crops. This pasture was mostly on sloping to very steep soils, and severe erosion has resulted. Large areas of woodland on the bottom lands of the Mississippi River have been cleared and planted to soybeans and grain sorghum in the last 20 years. The acreage of vegetable crops, especially tomatoes, has

increased in the past few years.

The soils on the uplands in Lauderdale County are now being used at or above their optimum level of intensity for row crops. These soils have some potential for increasing crop yields if improved production practices and technology are applied. Very little potential exists for converting to cropland the land that is now used as pasture or woodland or for other purposes. If present trends continue, cropland now in production will probably decline in productivity because of soil erosion. Some of the land now used for row crops is better suited to pasture or woodland. The information in this survey can be used to help apply technology that will increase yields and reduce land deterioration because of erosion.

The soils and climate of Lauderdale County are suited to most crops that are commonly grown in this area and to many that are not grown. Many nursery plants and small fruit and vegetable crops can be grown. For example, peanuts are well suited to Robinsonville fine sandy loam, and rice is suited to Keyespoint, Openlake, Sharkey, and Tunica soils that are part of the Mississippi River bottom lands.

Most crops, especially corn and vegetables that have high moisture requirements and high potential value, respond well to supplemental irrigation. Although supplemental irrigation is not commonly used, it would be practical to use on many soils in the county. Several different water sources for supplemental irrigation are available at various locations. This practice has potential for increased acreage in the future.

Deep, well drained and moderately well drained soils, such as Memphis and Loring soils on the uplands and Morganfield and Adler soils in small areas on the bottom lands, are well suited to a wide variety of crops, including many that are not now grown in the county.

Many soils in the county are more limited by the kinds of crops that can be grown. Wet, silty soils, such as Rosebloom and Arkabutla soils, and wet, clayey soils, such as Sharkey and Openlake soils, are limited to shorter season crops, such as soybeans and grain sorghum, that can be planted later in the season after most flooding is past and the soil has dried. Sandy soils, such as Crevasse and Bruno soils, are limited to deep-rooted, drought-tolerant crops, such as pasture grasses and alfalfa. Establishment of these crops is often difficult. Many other soils in the county have limitations, such as wetness, erodibility, or poor tilth, that affect the production of crops. These limitations are discussed in the individual map unit descriptions. The latest information and suggestions for growing crops can be obtained from local offices of the Soil Conservation Service and the Cooperative Extension Service.

Most of the upland and bottom land soils in the loess belt respond well to additions of fertilizer and lime. Applications of nitrogen, phosphorus, and potassium, ample rainfall, adequate weed control, and other management practices are needed to obtain maximum yields. The pH of these soils is normally strongly acid to neutral and some soils require periodic applications of lime. Fertilizer and lime should be applied according to soil test recommendations.

Most of the soils on the bottom lands along the Mississippi River are high in natural fertility and are medium acid to mildly alkaline except the soils in general soil map unit 3. These soils generally test moderate to high in phosphate and potash; therefore, little or no phosphate or potash needs to be added to most crops. Crops, such as cotton, corn, and wheat, require the addition of nitrogen fertilizer at the appropriate time. Periodic soil tests should still be made to ensure that fertility and pH are maintained at optimum levels. Because the soils in general soil map unit 3 are generally lower in pH and natural fertility, soil tests are needed to determine lime and fertilizer requirements for these soils.

Organic material reduces surface crusting and clodding and promotes good tilth. It reduces soil losses from erosion, and increases the water infiltration rate. Organic material is an important source of nitrogen for crops, and it increases crop tolerance for certain selective herbicides. Most of the soils in the loess belt, especially those that are severely eroded, have low organic matter content. The soils on the bottom land along the Mississippi River generally have a moderate organic matter content, but some of the sandier soils are low in organic material. In the clayey textured soils on the bottom land along the Mississippi River, organic material is especially important because it improves tilth and prevents the formation of a plowpan. Conservation tillage, crop rotation, and incorporating crop residue into the plow layer, rather than burning it, will increase the organic matter content.

Erosion is the major factor in reduced crop production on most of the loess uplands. Because of the combination of highly erosive silty soils, the intense rainfall pattern, and strongly sloping soils, west Tennessee, which includes Lauderdale County, has a severe soil erosion problem. Erosion reduces soil productivity, results in siltation of stream channels, increases flooding of lowlands, and lowers the quality of the water. Sediment from eroded fields carries pesticides and plant nutrients into the streams.

Soil erosion reduces productivity in several ways; tilth and water infiltration are reduced; available water capacity is significantly reduced in soils that have a fragipan; plant nutrients and organic matter are lost along with the topsoil; and the soil becomes susceptible to crusting, which causes poor seedling emergence. Cultivation over the years has caused large gullies to form in places. Many of these gullies, especially those in the steeper areas of Memphis and Loring soils, cannot be crossed by farm equipment. In soils, such as Loring and Grenada soils, severe erosion over a period of years will remove most or all of the soil above the fragipan. It will also drastically reduce the available water capacity because plant roots can extract very little water from the fragipan, and this will result in a severe reduction in yields. The soils in the loess belt of Lauderdale County are underlain by Coastal Plain sand and gravel at a depth that varies from 10 to 70 feet. If erosion continues at its present rate, the unproductive sand and gravel will eventually be exposed at the surface in some places.

Erosion control practices provide protective surface cover or reduce runoff, or both. Management practices, such as conservation tillage and the use of cover and green manure crops, absorb the impact of rainfall, thereby reducing runoff, increasing infiltration, and trapping soil particles. Terraces and contour plowing reduce erosion and runoff.

Practices in which a protective plant cover is used include a conservation tillage system, crop residue use, the use of cover and green manure crops, crop rotation that includes grasses and legumes, and contour stripcropping. Permanent plant cover can include grasses, legumes, or trees. These practices are the most effective ones available to reduce erosion. They also reduce runoff, increase organic matter content, improve tilth, maintain natural fertility, and increase nitrogen in the soil. Generally, the longer plant cover is left on the soil and the denser the cover, the more soil erosion is reduced.

The use of such practices as terraces, diversions, contour plowing, or constructing sediment retention structures will reduce soil erosion by slowing or reducing runoff. These practices are well suited to long, smooth slopes of less than 12 percent. They can be used on most Memphis, Loring, and Grenada soils unless the slopes are irregular in shape or are too steep. These practices are well suited to row crops. More information about soil erosion and technical assistance in selecting management practices and installing erosion control structures is available at the Soil Conservation Service.

Excessive wetness and flooding are limitations to crop production in large areas in the county. Most of the bottom lands along the Mississippi, Hatchie, and Forked Deer Rivers have some flooding or wetness that limits crop productivity and the selection of crops that can be grown. In many areas, the most limiting factors for crop production are wetness or flooding. Flooding occurs mostly late in the winter and early in the spring. The duration of flooding ranges from several days to several weeks, and a few areas remain flooded until early in the summer. Flooding severely reduces the effective growing season, which reduces the number of different crops that can be grown. In many areas, the selection of crops is limited to soybeans or grain sorghum. Little can be done to overcome the hazard of flooding. The frequency and duration of flooding should be considered before an attempt is made to cultivate areas that are subject to flooding since some land cannot be profitably farmed with any crop. Drainage ditches help remove excess water from low areas after the rivers fall. Before drainage projects are undertaken, regulations concerning drainage should be checked.

Subsurface drainage systems improve internal drainage in soils in which a high water table is a problem. Subsurface drainage systems work well in silty soils that have a good outlet to a stream or an open ditch and do not work well in heavy textured soils, such as Sharkey or Tunica soils, in which water moves very slowly through the soil.

Crops, such as cotton or corn, that are sensitive to wetness and that need to be planted early in the growing season are not suited to soils that are excessively wet or are subject to flooding. Bedding these wet soils into ridges in the fall helps the soil dry faster in the spring and saves steps in seedbed preparation because seed can be planted in the ridges earlier in the spring with little additional preparation. This practice is especially helpful in clayey soils, such as Openlake, Keyespoint, and Bowdre soils. Even with bedding, the lower areas are generally too wet for early planting. The ridges may be flattened if repeated and prolonged flooding takes place during the winter.

The clayey surface texture of many soils on the bottom lands along the Mississippi River makes tillage difficult. These soils are often referred to locally as "gumbo." The clayey surface layer of these soils results in high draft for tillage implements, makes preparation of a good seedbed difficult, and hinders seedling emergence. Extremely hard clods form if this soil is not plowed at the correct moisture content. This difficulty in preparing a seedbed often results in poor stands. In some years, fall plowing to expose the soil to freezing

and thawing and to wetting and drying will improve the tilth; however, this practice may not be economically feasible if the high fuel and equipment costs involved in plowing this heavy textured soil are considered.

These clayey soils also tend to form hard, compacted plowpans beneath the plow layer if they are worked over long periods with heavy equipment. These plowpans restrict root growth and water infiltration. During farming operations, if heavy equipment is moved across moist soil many times during the year, the formation of a plowpan tends to accelerate. These operations should be limited or consolidated, especially on wet soil, to reduce the formation of plowpans. Practices that increase organic matter content, such as spreading and incorporating crop residue into the soil rather than burning it, help to prevent the formation of plowpans.

Information on erosion control, drainage, and other soil management practices can be obtained at the local office of the Soil Conservation Service.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 6. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 6 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland *(5)*. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. There are no class I or class VIII soils designated in Lauderdale County. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have

limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, or *s*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

There are no subclasses in class I because the soils of this class have few limitations. The soils in class V are subject to little or no erosion, but they have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation. Class V contains only the subclasses indicated by *w*.

The acreage of soils in each capability class and subclass is shown in table 7. The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Woodland Management and Productivity

Virgin hardwood forest once covered all of Lauderdale County, but the trees have been cleared on most of the land that is suitable for cultivation and even on some of the land that is not suitable. The areas that have remained in woodland are mostly too steep, too wet, or too inaccessible for farming to be practical. In most woodland areas, timber has been harvested at least once; and, in many areas, it has been harvested several times. Some woodland areas are abandoned cropland or pasture. In most woodland areas, the soils are well suited to the production of trees. Trees grow fast and produce high yields of good quality timber if the woodlands are properly managed.

Woodland now makes up about 80,000 acres, or 20 percent, of the county. The largest contiguous blocks of woodland are on the bottom land of the Mississippi River and are privately owned by timber industries. Moderate-size blocks of woodland are in the Hatchie National Wildlife Refuge, Fort Pillow State Historic Area, and Fort Pillow State Farm. The rest of the woodland is mostly in small-size blocks of privately owned bottom land of the Hatchie River and in the steepest upland areas.

The largest areas of woodland are in general soil map units 1, 2, and 8. In many scattered smaller tracts in map unit 4 are sizeable areas of woodland. The most common trees in general soil map unit 1 are eastern cottonwood, sweetgum, cherrybark oak, sugarberry, American elm, black willow, and American sycamore. These areas consist of relatively recently deposited alluvium, and the trees growing in these areas are in a first or second succession of forest plants. The tree canopy is not complete in many places, and the undergrowth is extremely dense. Grape and poison ivy vines are abundant, and they cover and retard the growth of many trees. In general soil map unit 2, the woodland areas generally have a more advanced succession of timber, and the trees have a crown canopy that is more dense. The major trees in these areas include American elm, sugarberry, pecan, sweetgum, bottomland oak and hickory, eastern cottonwood, American sycamore, and baldcypress. Some very wet areas consist of almost pure stands of baldcypress and water tupelo. In general soil map unit 8, woodland areas consist of mature stands of water-tolerant hardwoods in an advanced succession. Most areas have a dense crown cover and only moderate undergrowth. Common trees include overcup oak, swamp white oak, swamp chestnut oak, willow oak, hickory, sweetgum, ash, and elm. Baldcypress and water tupelo are dominant in very wet areas.

Considerable woodland is in many scattered smaller tracts in general soil map unit 4. These woodland areas vary in tree composition, stand density, and tree size according to past management and harvesting practices. Common trees in this map unit include bottom land oak and hickory, yellow poplar, sweetgum, beech, sugar maple, and American elm.

Most of the existing woodland would benefit if stands were improved by removing mature or deformed trees and undesirable species. Restocking and controlling the competing vegetation, such as vines, are needed in places. Fire protection, controlled grazing, and control of disease and insects are also needed to improve stands. Tree planting is needed on some steep and wet areas where farming has proved impractical. The Soil Conservation Service, the Cooperative Extension Service, or the Tennessee Division of Forestry can help determine specific management needs.

Soils vary in their ability to produce trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Available water capacity and depth of the root zone are major influences of tree growth. Elevation and aspect are of particular importance in mountainous areas.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to fertilization than

others, and some are more susceptible to landslides and erosion after roads are built and timber is harvested. Some soils require special efforts to reforest. In the section "Detailed Soil Map Units," each map unit in the survey area suitable for producing timber presents information about productivity, limitations for harvesting timber, and management concerns for producing timber. Table 8 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation activities or harvesting operations expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of *moderate* or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning of harvesting and reforestation operations, or use of specialized equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, or susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment must be used. On the steepest slopes, even tracked equipment cannot operate; more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are steep enough that wheeled equipment cannot be operated safely across the slope, if soil wetness restricts equipment use from 2 to 6 months per year, or if special equipment is needed to avoid or reduce soil compaction. The rating is *severe* if slopes are steep enough that tracked equipment cannot be operated safely across the slope, if soil wetness restricts equipment use for more than 6 months per year, or if special equipment is needed to avoid or reduce soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management operations.

Ratings of *seedling mortality* refer to the probability of death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall as influenced by kinds of soil or topographic features. *Seedling mortality* is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth and duration of the water table, rock fragments in the surface layer, rooting depth, and the aspect of the slope. Mortality generally is greatest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing surface drainage, or providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is *moderate* or *severe*.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. *Plant competition* becomes more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants reduces adequate natural or artificial reforestation but does not necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants reduces natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A *moderate* or *severe* rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The potential productivity of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands.

The *productivity class* represents an expected volume produced by the most important trees, expressed in cubic feet per acre per year. It can be converted to board feet by multiplying by a factor of about 5. For

example, a productivity class of 114 means the soil can be expected to produce 114 cubic feet per acre per year at the point where mean annual increment culminates, or about 570 board feet per acre per year.

Trees to plant are those that are used for reforestation or, if suitable conditions exist, natural regeneration. They are suited to the soils and will produce a commercial wood crop. Desired product, topographic position (such as a low, wet area), and personal preference are three factors of many that can influence the choice of trees to use for reforestation.

Recreation

Lauderdale County has many areas of scenic and historic interest. Woodland and water resources offer many opportunities for outdoor recreation activities, including hunting, fishing, boating, camping, hiking, water skiing, and swimming. Fort Pillow State Historic Area, site of Civil War battles, has facilities for camping and hiking and opportunities to observe and study historic and natural areas. Key Corner, Porter's Gap, and Alex Haley's boyhood home in Henning are also sites of historic interest. The cities of Ripley and Halls have public parks and recreation facilities.

Lauderdale County has great potential for water recreation with about 47 miles of the Mississippi River, 20 miles of the Hatchie River, 11 natural lakes that range from 15 to 1,200 acres, 14 manmade lakes of more than 5 acres, and about 900 manmade lakes that range from 0.5 acre to 5 acres. Several boat launching facilities are available on the Mississippi River and major lakes. The Hatchie State Scenic River, which forms the southern boundary of Lauderdale County, is one of the few remaining unchanneled, meandering, swamp-type rivers in the southern United States. It provides opportunities for fishing, boating, and observing wildlife and plant communities that are unique to this environment.

The Anderson-Tully Wildlife Management Area, which is managed by the Tennessee Wildlife Resources Agency, provides about 30,000 acres on bottom lands in the Mississippi River for public hunting. The Hatchie Wildlife Refuge on the bottom lands of the Hatchie River near Fulton provides about 1,800 acres.

Use of recreational facilities in Lauderdale County has increased in the past several years along with the growing population of the region, increased availability of leisure time, and growing popularity of outdoor recreation. Tourists and outdoor sportsmen come from all over the mid-South to use Lauderdale County's outdoor recreational, scenic, and historic areas.

Soils in general soil map units 1, 2, 3, and 8 are well suited to wetland and water-related recreational development. In areas of general soil map unit 4, varied, hilly terrain, wooded areas with diverse plant and animal species and common streams provide a variety of possibilities for potential outdoor recreation.

In table 9, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 9, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 9 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 12 and interpretations for dwellings without basements and for local roads and streets in table 11.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm and is not dusty when dry. Strong slopes can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet,

are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains and is not dusty when dry. If grading is needed, the depth of the soil over a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Lauderdale County has a large and varied population of wildlife and fish. Small game species, such as rabbits, squirrels, raccoons, quail, and dove, are throughout the county. These species are well suited to the scattered woodlots, thickets, and fencerows on the cultivated loess uplands and to larger wooded tracts on the bottom lands. Large tracts of bottom land hardwoods on the flood plains of the Mississippi and Hatchie Rivers also support populations of white-tailed deer, wild turkey, and European wild boar. Nongame species in the county include opossum, groundhog, fox, coyote, beaver, mink, and muskrat. A wide variety of birds including many songbirds, raptors, and aquatic birds, such as herons and cranes, are in the county. Lakes and other wetlands on the flood plains of the Mississippi, Hatchie, and Forked Deer Rivers provide breeding habitat for wood ducks and resting and feeding areas for other migratory waterfowl that use the Mississippi flyway.

The streams, lakes, and ponds of Lauderdale County support crappie, bream, largemouth bass, and catfish. Nongame species, such as gar, carp, buffalo, bowfin (grinnel), and drum, are also abundant, especially in lakes, oxbows, and sloughs (fig. 14) on the flood plains of the Mississippi River. Siltation, pesticide contamination, drainage, and illegal fishing methods are some of the major problems that have reduced the quality and quantity of fish habitat in Lauderdale County.

Most areas in the county could be improved for use as wildlife habitat by increasing the food, water, and cover for wildlife. Areas in general soil map units 4, 5, and 6 are well suited to improving habitat for upland wildlife species. Of these upland areas, general soil map unit 4 has the highest diversity of woodlots, cropland, and grassland. This mix of plant cover offers the best upland wildlife habitat. General soil map units 5 and 6 have more land that is cleared and intensively cropped. These map units offer less diversity of cover types and thus a lower quality of wildlife habitat. General soil map units 1, 2, 3, 7, and 9 are bottom land and have potential for development as habitat for a variety of wildlife species including waterfowl. General soil map units 1, 2, and 8 probably have the best wildlife habitat on the bottom lands at this time because extensive tracts of highly productive bottom-land hardwood forests have been left in these map units. General soil map units 3 and 9 are more intensively cropped with large tracts of cleared land and few wooded tracts.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 10, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or

Figure 14.—Old sloughs, channels, and cutoffs are common on the Mississippi River flood plain and provide habitat for fish and wetland wildlife.

kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, soybeans, and wheat.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood

hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, switchgrass, orchardgrass, clover, annual lespedeza, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are ragweed, goldenrod, beggarweed, partridge pea, and broomsedge.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are shrub lespedeza, shrub honeysuckle, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, baldcypress, and redcedar.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, and slope. Examples of wetland plants are smartweed, wild millet, cattails, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water control structures. Soil properties and features affecting shallow water areas are wetness, slope, and permeability. Examples of shallow water plants are coontail, spatterdock, cowlily, lotus, waterlily, and pondweed.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet, and because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to: evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground

cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 11 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to a very firm dense layer, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. Depth to a high water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to a high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost-action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, the available water capacity in the upper 40 inches, and the content of salts or sodium affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 12 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 12 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good*

indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, and flooding affect absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 12 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, and flooding.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 12 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a water table, slope, and flooding affect both types of landfill. Texture, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 13 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low

embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing estimated engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by a high water table and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential or slopes of 15 to 25 percent. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 13, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, or soils that have only 20 to 40 inches of suitable material, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant-available nutrients as it decomposes.

Water Management

Table 14 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts or sodium. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, and depth to a fragipan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, low fertility and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 15 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area, or from nearby areas, and on field examination.

Physical and Chemical Properties

Table 16 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 16, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be

maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 17 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 17 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none, rare, occasional,* or *frequent. None* means that flooding is not probable. *Rare* means that flooding is unlikely but possible under unusual weather conditions (there is a near 0 to 5 percent chance of flooding in any year). *Occasional* means that flooding occurs infrequently under normal weather conditions (there is a 5 to 50 percent chance of flooding in any year). *Frequent* means that flooding occurs often under normal weather conditions (there is more than a 50 percent chance of flooding in any year). Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. December-April, for example, means that flooding can occur during the period December through April. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered is local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 17 are the depth to the seasonal high water table; the kind of water table, that is, *perched* or *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 17.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

The two numbers in the "High water table—Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot.

The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(6)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 18 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquents (*Hapl*, meaning minimal horizonation, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, nonacid, mesic Typic Haplaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (4)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (6)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Adler Series

The Adler series consists of deep, nearly level, moderately well drained, moderately permeable soils that formed in deposits of recent alluvium. These soils are on the flood plains of streams and narrow drainageways. The slopes range from 0 to 2 percent.

Adler soils are geographically associated with Morganfield, Memphis, and Loring soils. Morganfield soils are in similar positions on the landscape as Adler soils but are well drained. Memphis and Loring soils are on adjacent uplands, have an argillic horizon, and are not subject to flooding.

Typical pedon of Adler silt loam, occasionally flooded; 2.3 miles southeast of the Henning City limits on the Henning-Orysa Road, 800 feet south and 75 feet west of a creek in a pasture:

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine subangular blocky and weak fine granular structure; friable; many fine roots; medium acid; abrupt smooth boundary.

C1—6 to 21 inches; brown (10YR 4/3) silt loam; common medium distinct light brownish gray (2.5Y 6/2) mottles and few fine distinct strong brown (7.4YR 4/6) mottles; massive; friable; common fine roots; many very dark stains; medium acid; clear wavy boundary.

C2—21 to 44 inches; mottled dark grayish brown (10YR 4/2), very dark grayish brown (10YR 3/2), and grayish brown (10YR 5/2) silt loam; massive; friable; few fine roots; medium acid; clear smooth boundary.

C3—44 to 60 inches; mottled yellowish brown (10YR 5/4) and light brownish gray (2.5Y 6/2) silt loam; massive; friable; medium acid.

The reaction ranges from medium acid to neutral in the A and C horizons.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The texture is silt loam.

The C horizon to a depth of 20 inches has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. This horizon has few to many gray and brown mottles. Below a depth of 20 inches, the C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. Mottles range from few to many in shades of gray and brown, and some pedons are mottled without a dominant matrix color. The texture is silt loam.

Amagon Series

The Amagon series consists of poorly drained soils that formed in old silty alluvium. Amagon soils have an overwash layer of fine textured, recent alluvium on the surface. These soils are in broad, flat areas and in long, narrow depressions on the Mississippi River flood plain. Most Amagon soils are between the old bed of the Forked Deer River and the loess bluffs and north of Chisholm Lake. The slopes are 0 to 2 percent.

Amagon soils are geographically associated with Dundee, Askew, and Sharkey soils. Dundee and Askew soils are in slightly higher positions on the landscape than Amagon soils. Dundee soils are somewhat poorly drained, and Askew soils are moderately well drained. Sharkey soils are clayey and are in a lower position.

Typical pedon of Amagon silty clay loam, overwash, frequently flooded; 6,000 feet west of Key Corner Road on Tennessee State Highway 88 to a field road, south 2,200 feet, east 1,450 feet, and 15 feet south of the field road in a cultivated field:

Ap—0 to 6 inches; dark brown (10YR 3/3) silty clay loam; weak medium granular structure; firm; few fine roots; medium acid; clear smooth boundary.

Cg—6 to 10 inches; light brownish gray (10YR 6/2) silty clay loam; common fine prominent strong brown (7.5YR 4/6) mottles and common fine distinct brown (10YR 4/3) mottles; massive; firm; few fine roots; slightly acid; clear smooth boundary.

2Eg—10 to 16 inches; gray (10YR 5/1) silt loam; common fine prominent strong brown (7.5YR 4/6) mottles and common fine distinct brown (10YR 4/3) mottles; weak medium subangular blocky structure; friable; few fine roots; slightly acid; gradual smooth boundary.

2Btg1—16 to 26 inches; gray (10YR 5/1) silt loam; common fine distinct brown (10YR 4/3) mottles and few fine prominent dark yellowish brown (10YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine roots; many fine pores; thin discontinuous clay films; slightly acid; gradual smooth boundary.

2Btg2—26 to 46 inches; gray (10YR 5/1) silty clay loam; common fine distinct yellowish brown (10YR 5/4) mottles and few fine prominent strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; firm; very fine roots; few very fine pores; discontinuous clay films; slightly acid; gradual smooth boundary.

2BC—46 to 55 inches; light brownish gray (2.5Y 6/2) loam; common coarse prominent dark yellowish brown (10YR 4/4) and strong brown (7.5YR 4/6) mottles and common medium distinct light yellowish brown (10YR 6/4) mottles; weak medium prismatic

structure parting to weak medium subangular blocky; friable; few fine roots; few fine pores; neutral; gradual smooth boundary.

2C—55 to 62 inches; grayish brown (10YR 5/2) loam; common medium prominent yellowish red (5YR 4/6) mottles and common medium faint light gray (10YR 6/1) mottles; massive; friable; neutral.

The solum is 50 to 65 inches thick. The reaction ranges from strongly acid to slightly acid in the A, C, 2E, and 2Bt horizons, and it is slightly acid or neutral in the 2BC and 2C horizons. The Ap and C horizons are recent alluvium and range from 8 to 20 inches in thickness.

The Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. This horizon is mottled in shades of brown. The texture is silty clay loam or silty clay.

The C horizon has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. The texture is silty clay loam or silty clay. Some pedons do not have a C horizon.

The 2E horizon has hue of 10YR, value of 5, and chroma of 1; or hue of 10YR, value of 6, and chroma of 1 or 2. This horizon is mottled in shades of brown. The texture is silt loam.

The 2Btg horizon has hue of 10YR, value of 5 or 6, and chroma of 1; or hue of 10YR or 2.5Y, value of 6, and chroma of 1. Some pedons have value of 5 and chroma of 2 in the lower part of the 2Btg horizon. This horizon is mottled in shades of brown. The texture is silt loam or silty clay loam.

The 2BC horizon and 2C horizon have hue of 10YR, value of 4 to 6, and chroma of 1 or 2. These horizons are mottled in shades of brown. The texture is loam, silt loam, or silty clay loam. Some pedons do not have a 2BC horizon and 2C horizon.

Arkabutla Series

The Arkabutla series consists of deep, nearly level, somewhat poorly drained soils that formed in silty alluvium on the Forked Deer River flood plain. The mapped areas are 10 to 250 acres. The slopes range from 0 to 2 percent.

Arkabutla soils are geographically associated with Rosebloom, Convent, and Adler soils. Rosebloom soils are in similar or slightly lower positions than Arkabutla soils and are poorly drained. Convent soils, which are near tributary streams, are moderately acid to neutral and have less than 18 percent clay in the control section. Adler soils are in slightly higher positions near stream channels, are moderately well drained, have less than 18 percent clay in the control section, and are medium acid to neutral.

Typical pedon of Arkabutla silt loam, frequently flooded; 1.1 miles north of Twin Rivers Road on Forked Deer Levee Road, 18 miles west of the Forked Deer River channel on a drainage ditch levee road, and 400 feet south in a cultivated field:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; moderate fine granular structure; friable; common very fine roots; medium acid; abrupt smooth boundary.

Bw/C—5 to 14 inches; brown (10YR 4/3) silt loam; common medium faint grayish brown (10YR 5/2) mottles and few fine prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores, thin stratification in places; few black manganese stains; strongly acid; abrupt smooth boundary.

Bg1—14 to 18 inches; dark gray (10YR 4/1) silt loam; common medium faint grayish brown (10YR 5/2) mottles and common medium distinct yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; common fragments of charcoal; strongly acid; abrupt smooth boundary.

Bg2—18 to 35 inches; gray (10YR 5/1) silt loam; common medium and fine prominent red (2.5YR 4/8) mottles, few medium distinct brown (10YR 5/3) mottles, and few fine prominent yellowish red (5YR 5/8) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine and medium pores; few fine charcoal fragments; strongly acid; clear wavy boundary.

Bg3—35 to 55 inches; gray (10YR 6/1) silty clay loam; common medium prominent yellowish red (5YR 5/8) mottles and few medium distinct brown (10YR 5/3) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; few fine pores; few very fine particles of charcoal and manganese; few shiny ped faces; very strongly acid; gradual smooth boundary.

Bg4—55 to 65 inches; gray (10YR 6/1) silt loam; many fine prominent strong brown (7.5YR 5/8) mottles and few medium prominent yellowish red (5YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine pores; few shiny ped faces; common medium black manganese stains; strongly acid.

The solum ranges from 45 to 65 inches in thickness. The reaction is strongly acid or very strongly acid except where lime has been added.

The A horizon has hue of 10YR, value of 4, and chroma of 3 or 4. The texture is silt loam.

The Bw/C horizon or Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 2; or hue of 10YR, value of 4 or 5, and chroma of 3 or 4. The BwC horizon or Bw horizon has few to many mottles of chroma of 2 or less.

The Bg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. This horizon is mottled in shades of brown, red, and yellow. The texture is silt loam or silty clay loam.

Askew Series

The Askew series consists of moderately well drained soils that formed in loamy old alluvium. Many areas of Askew soils on the Mississippi River flood plain have an overwash layer of moderately fine textured recent alluvium on the surface. A few of the higher areas on the Mississippi River flood plain and most areas on low terraces adjacent to the Hatchie River do not have this overwash layer of recent alluvium. Most of the Askew soils are on the Mississippi River flood plain between the old bed of the Forked Deer River and the loess bluff and north of Chisholm Lake. Some areas of Askew soils are on low terraces adjacent to the Hatchie River flood plain, and a few areas are in the lower unit of the Anderson-Tully Wildlife Management Area, between Cold Creek and the loess bluff. The slopes are 0 to 2 percent.

Askew soils are geographically associated with Dundee and Dubbs soils. Dundee soils are in slightly lower positions on the landscape than Askew soils and are somewhat poorly drained. Dubbs soils are in higher positions and are well drained.

Typical pedon of Askew silty clay loam, overwash, occasionally flooded; 1.2 miles west of Porter's Gap, 116 feet north of Tennessee State Highway 88, and 408 feet west of a field road in a cultivated field:

Ap—0 to 6 inches; dark brown (10YR 3/3) silty clay loam; weak fine granular structure; firm; common medium and fine roots; medium acid; abrupt smooth boundary.

C—6 to 10 inches; dark brown (10YR 4/3) silty clay loam; few fine faint grayish brown mottles; massive; firm; common medium and fine roots; iron and manganese accumulations; medium acid; abrupt smooth boundary.

2A—10 to 15 inches; brown (10YR 4/3) silt loam; common fine faint grayish brown mottles and common fine distinct dark yellowish brown (10YR 4/6) mottles; weak fine subangular blocky structure; friable; common fine roots; very strongly acid; clear smooth boundary.

2Bt1—15 to 21 inches; dark yellowish brown (10YR 4/4) silt loam; common medium faint brown (10YR 5/3) mottles, common medium distinct grayish brown (10YR 5/2) mottles, and few medium distinct yellowish brown (10YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine roots; common fine pores; thin patchy clay films; few fine iron and manganese concretions; very strongly acid; gradual smooth boundary.

2Bt2—21 to 33 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct grayish brown (10YR 5/2) mottles, common medium faint brown (10YR 5/3) mottles, and common medium distinct yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; common fine roots; few fine pores; common thin clay films: common medium iron and manganese nodules; very strongly acid; gradual smooth boundary.

2Bt3—33 to 48 inches; dark yellowish brown (10YR 4/4) loam; many medium distinct grayish brown (10YR 5/2) mottles and common medium distinct yellowish brown (10YR 5/8) mottles; weak medium and coarse subangular blocky structure; friable; few fine roots; few fine and medium pores; common clay films; common medium iron and manganese nodules; very strongly acid; gradual smooth boundary.

3C—48 to 62 inches; yellowish brown (10YR 5/4) fine sandy loam; many medium distinct light brownish gray (10YR 6/2) mottles and common medium distinct yellowish brown (10YR 5/8) mottles; massive; very friable; few fine roots; common medium iron and manganese nodules; very strongly acid.

The thickness of the overwash ranges from 6 to 15 inches. Some pedons do not have an overwash layer. The solum ranges from 30 to 44 inches in thickness, but it is slightly thicker if an overwash layer is present. The reaction ranges from very strongly acid to medium acid, but the overwash layer is slightly acid or medium acid.

The Ap horizon has hue of 10YR, value of 4, and chroma of 2 or 3. The texture is silt loam. In pedons that have an overwash layer, the Ap horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. The texture is silty clay loam.

The C horizon has hue of 10YR, value of 4, and chroma of 2 or 3. The texture is silty clay loam. Mottles are few to common in shades of brown. This horizon is

only in pedons that have an overwash layer.

The upper part of the Bt horizon or 2Bt horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. Mottles are common or many with chroma of 2 or less. The lower part of these horizons has the same colors as the upper part or has hue of 10YR, value of 5 or 6, and chroma of 2 with mottles of higher chroma. The texture is silt loam, loam, or silty clay loam.

The 2C horizon or 3C horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6. These horizons are mottled in shades of gray and brown. The texture is dominately fine sandy loam or loam, but a few pedons have strata that range from fine sandy loam or loam to fine sand.

Bowdre Series

The Bowdre series consists of deep, nearly level to gently sloping, somewhat poorly drained soils that formed in sediment that consists of a layer of clayey alluvium underlain by thick beds of loamy alluvium. These soils are in the higher parts of slack-water areas on the Mississippi River flood plain. The slopes are dominantly less than 2 percent but can range from less than 2 to 5 percent.

Bowdre soils are geographically associated with Keyespoint, Sharkey, and Tunica soils. Keyespoint soils are in similar positions on the landscape as Bowdre soils and have clay texture to a depth of 20 to 40 inches. Sharkey and Tunica soils are in slightly lower positions and are poorly drained. In addition, Sharkey soils have clay texture to a depth of more than 40 inches, and Tunica soils have clay texture to a depth of 20 to 40 inches.

Typical pedon of Bowdre silty clay, occasionally flooded; 3.1 miles southeast of Tennessee State Highway 19 on Jones Slough Road and 180 feet south in a cultivated field:

Ap—0 to 6 inches; very dark grayish brown (10YR 3/2) silty clay, grayish brown (10YR 5/2) dry; weak fine granular structure; very hard, very firm, very plastic and very sticky; common fine and medium roots; slightly acid; abrupt smooth boundary.

Bw—6 to 18 inches; very dark grayish brown (10YR 3/2) silty clay, grayish brown (10YR 5/2) dry; common medium faint brown (10YR 4/3) mottles and few fine faint dark gray mottles; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common fine roots; few medium pores; common worm channels and casts; shiny ped faces; slightly acid; gradual smooth boundary.

2C1—18 to 34 inches; brown (10YR 4/3) silt loam; common medium faint brown (10YR 5/3) and grayish brown (10YR 5/2) mottles; massive; slightly hard, friable, nonsticky and nonplastic; few coarse medium and fine roots; common fine pores; few worm channels and casts; slightly acid; abrupt smooth boundary.

2C2—34 to 40 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; hard, friable, slightly plastic and slightly sticky; common fine roots; few fine and medium pores; shiny ped faces; neutral; abrupt smooth boundary.

2C3—40 to 60 inches; yellowish brown (10YR 5/3) silt loam; common medium faint light brownish gray (10YR 6/2) mottles and few fine distinct dark yellowish brown (10YR 4/6) mottles; massive; soft, friable, nonsticky and nonplastic; common fine roots; many fine pores; common worm holes and casts; slightly acid.

Depth to the contrasting loamy 2C horizon ranges from 12 to 20 inches. The reaction ranges from slightly acid to mildly alkaline in the A, Bw, and 2C horizons.

The A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The texture is clay or silty clay.

The Bw horizon has hue of 10YR, value of 3, and chroma of 2 or 3. This horizon is mottled in shades of gray and brown. The texture is clay or silty clay. The thickness of the mollic epipedon ranges from 11 to 20 inches.

The 2C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Pedons with chroma of 3 have common or many mottles with chroma of 2 or less, and some pedons are mottled brown and gray without a dominant color. The texture is silt loam, loam, or very fine sandy loam. Some pedons have thin subhorizons of silty clay loam.

Bruno Series

The Bruno series consists of excessively drained soils that formed in sandy alluvium. These soils are generally on natural levees along the Mississippi River. A few small areas are along the base of the bluff. These soils formed in sandy deposits that washed out of the bluff. The slopes range from 0 to 5 percent.

Bruno soils are geographically associated with Crevasse and Robinsonville soils. Crevasse soils are in similar positions on the landscape as Bruno soils, and they do not have strata finer than loamy fine sand.

Robinsonville soils have a finer texture than Bruno soils.

Typical pedon of Bruno loamy fine sand, occasionally flooded; 4,100 feet northeast of New Mitchell Grove Church, 500 feet south of the Mississippi River, and 1,900 feet north of Barr Road:

Ap—0 to 5 inches; dark brown (10YR 3/3) loamy fine sand; weak fine subangular blocky structure; very friable; common fine roots; mildly alkaline; abrupt smooth boundary.

C1—5 to 13 inches; brown (10YR 5/3) sand; massive; very friable; common fine roots; thin stratification; mildly alkaline; abrupt smooth boundary.

C2—13 to 17 inches; brown (10YR 4/3) very fine sandy loam; massive; friable; few fine roots; thin stratification; mildly alkaline; abrupt smooth boundary.

C3—17 to 20 inches; brown (10YR 4/3) loam; thin strata of dark yellowish brown (10YR 4/6); massive; friable; few fine roots; few fine pores; few stains; thin stratification; mildly alkaline; abrupt smooth boundary.

C4—20 to 30 inches; yellowish brown (10YR 5/4) loamy fine sand; massive; friable; few very fine roots; thin stratification; mildly alkaline; clear wavy boundary.

C5—30 to 37 inches; brown (10YR 5/3) loamy sand; massive; very friable; few very fine roots; thin stratification; mildly alkaline; abrupt wavy boundary.

C6—37 to 45 inches; pale brown (10YR 6/3) loamy fine sand; massive; very friable; few fine roots; thin stratification; moderately alkaline; abrupt smooth boundary.

C7—45 to 48 inches; brown (10YR 5/3) very fine sandy loam; massive; very friable; few very fine roots; few pores; thin stratification; thin red specks; moderately alkaline; abrupt broken boundary.

C8—48 to 73 inches; pale brown (10YR 6/3) sand; single grained; loose; few very fine roots; thin stratification; mildly alkaline.

The reaction ranges from medium acid to moderately alkaline in the A and C horizons.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 3 or 4. Horizons that have value of 3 are less than 6 inches thick. The texture is loamy fine sand, fine sandy loam, and loamy sand. In addition, some pedons have a layer of silty clay loam overwash.

The C horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. The texture is dominately sand, fine sand, loamy sand, or loamy fine sand but includes very fine sand, loamy very fine sand, sandy loam, very fine sandy loam, loam, or silt loam.

Calloway Series

The Calloway series consists of deep, somewhat poorly drained soils that formed in thick loess deposits. These soils are on long, smooth, slightly concave slopes on undulating to sloping uplands, in depressional areas at the head of drainageways, or on low, nearly level foot slopes. The slopes are 0 to 2 percent.

Calloway soils are geographically associated with Grenada and Routon soils. Grenada soils are in higher positions on the landscape than Calloway soils and are moderately well drained. Routon soils are in lower, flatter positions, are poorly drained, and do not have a fragipan.

Typical pedon of Calloway silt loam; 2,275 feet south of Pittman's Store in Luckett on Luckett-Three Point Road, east 750 feet on a gravel road, and north 150 feet in a cotton field:

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; weak medium granular structure; friable; few fine roots; few fine concretions; slightly acid; clear broken boundary.

Bw1—7 to 14 inches; yellowish brown (10YR 5/6) silt loam; common fine and medium distinct strong brown (7.5YR 5/8) mottles and common medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable; common fine roots; common fine pores; few black concretions; black and brown stains; medium acid; clear smooth boundary.

Bw2—14 to 19 inches; light yellowish brown (2.5Y 6/4) silt loam; many medium distinct yellowish brown (10YR 5/6) mottles and few medium distinct light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable; common fine roots; common fine pores; common black and brown concretions; strongly acid; clear wavy boundary.

E—19 to 27 inches; light gray (10YR 7/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles and few medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; common fine roots; many fine and medium pores; many medium and fine black and brown concretions; black and brown stains; strongly acid; clear wavy boundary.

Btx1—27 to 36 inches; grayish brown (2.5Y 5/2) silt loam; many medium distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine

roots concentrated between prisms; common fine and very fine pores; clay films on prism faces; many medium and fine black and brown concretions; brittle; light gray (10YR 7/1) silt coatings on prism faces; brown and black stains; medium acid; gradual smooth boundary.

Btx2—36 to 53 inches; mottled yellowish brown (10YR 5/4), light brownish gray (2.5Y 6/2), and dark yellowish brown (10YR 4/6) silt loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few fine and very fine roots between prisms; clay films on faces of prisms; common fine and very fine black and brown concretions; brittle; thin light gray (10YR 7/1) silt coatings on prism faces; black and brown stains; medium acid; gradual smooth boundary.

Btx3—53 to 62 inches; mottled light brownish gray (2.5Y 6/2), dark yellowish brown (10YR 4/6), and yellowish brown (10YR 5/6) silt loam; weak coarse prismatic structure parting to weak medium subangular blocky; firm, slightly brittle; many fine pores; patchy clay films on faces of prisms; thin light gray (10YR 7/1) silt coatings on prism faces; few fine concretions; black and brown stains; medium acid.

The solum is more than 60 inches thick. The reaction ranges from very strongly acid to medium acid, but it ranges from very strongly acid to neutral in the surface layer and lower part of the subsoil if lime has been added. Depth to the fragipan is 22 to 30 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. A few pedons have a thin A horizon that has value of 3. The texture is silt loam.

The Bw horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 4 or 6; or hue of 10YR or 2.5Y, value of 6, and chroma of 4. This horizon is mottled in shades of brown and gray. The texture is silt loam.

The E horizon has hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 2. This horizon is mottled in shades of brown and yellow. The texture is silt loam or silt.

The Btx horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 2 to 6. Mottles are in shades of brown, yellow, and gray. Some subhorizons of some pedons are mottled in shades of brown and gray without a dominant color. The texture is silt loam.

Center Series

The Center series consists of deep, nearly level to undulating, somewhat poorly drained soils that formed in thick loess deposits. These soils are in broad areas on the loess uplands and on loess covered terraces. The slopes range from 0 to 3 percent.

Center soils are geographically associated with Routon and Calloway soils. Routon soils are poorly drained and are in slightly lower positions on the landscape than Center soils. Calloway soils have a fragipan and are in similar to slightly higher positions.

Typical pedon of Center silt loam; from a point on old U.S. Highway 51, 3,600 feet north of Cane Creek bridge, 0.1 mile west and 430 feet south of a railroad spur to Marvin Window factory in a cultivated field:

Ap—0 to 8 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; few fine roots; slightly acid; abrupt wavy boundary.

BA—8 to 15 inches; yellowish brown (10YR 5/6) silt loam; few fine distinct light gray (10YR 7/2) mottles and common medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; few fine roots; common fine pores; common iron and manganese stains and concretions; slightly acid; gradual smooth boundary.

Bt1—15 to 27 inches; yellowish brown (10YR 5/4) silt loam; common fine distinct light gray (10YR 7/2) and yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; friable; few fine roots; common fine pores; patchy clay films; common iron and manganese stains; medium acid; gradual smooth boundary.

Bt2—27 to 36 inches; yellowish brown (10YR 5/4) silt loam; common fine prominent strong brown (7.5YR 5/8) mottles and common fine faint light brownish gray (10YR 6/2) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; common fine roots; common fine pores; continuous clay films on prism faces, common iron and manganese stains; slightly acid; clear smooth boundary.

Btg—36 to 50 inches; grayish brown (10YR 5/2) silt loam; common fine prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; common fine pores; common iron and manganese stains; thin patchy clay films; neutral; gradual smooth boundary.

Cg—50 to 62 inches; grayish brown (10YR 5/2) silt loam; common fine prominent strong brown (7.5YR 5/8) and brownish yellow (10YR 6/8) mottles; massive; friable; common fine pores, neutral.

The solum ranges from 35 to 60 inches in thickness. The reaction of the A, BA, and upper part of the Bt horizons ranges from strongly acid to slightly acid. It

ranges from medium acid to neutral in the lower part of the Bt and C horizons.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The texture is silt loam.

The BA and Bt horizons have hue of 10YR, value of 4 to 6, and chroma of 4 to 6. These horizons have few to many mottles of chroma of 2 or less and value of 4 or more. The texture of the BA horizon is silt loam, and the texture of the Bt horizon is silt loam or silty clay loam.

The Btg horizon has hue of 10YR and 2.5Y, value of 5 or 6, and chroma of 2. This horizon is mottled in shades of brown and yellow. The texture is silt loam or silty clay loam.

Some pedons have a C horizon and a BC horizon that have hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 and have mottles in shades of brown and yellow; or have hue of 10YR or 2.5Y, value of 5, and chroma of 4 or 6 and have mottles in shades of gray and brown. In some pedons, these horizons are mottled without a dominant color. The texture is silt loam.

Commerce Series

The Commerce series consists of deep, nearly level, somewhat poorly drained soils that formed in medium textured alluvium on the flood plain of the Mississippi River. The slopes range from 0 to 2 percent.

Commerce soils are geographically associated with Keyespoint, Robinsonville, Tunica, and Sharkey soils. Keyespoint soils, which are farther from the river channel, have a clayey over loamy particle-size control section. Robinsonville soils are in slightly higher positions on natural levees, have a coarse, loamy particle-size control section, and are well drained. Tunica and Sharkey soils are in slack-water areas that are farther from the river and are poorly drained. Tunica soils have a clayey over loamy particle-size control section, and Sharkey soils have a very fine particle-size control section.

Typical pedon of Commerce silt loam, occasionally flooded; 0.6 mile northeast of Ashport Store on Tennessee State Highway 19, south 900 feet on a field road, and 20 feet west of field road in a cultivated field:

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam; weak fine granular structure; slightly hard, friable, slightly sticky and nonplastic; few fine roots; mildly alkaline; clear smooth boundary.

A—7 to 11 inches; dark grayish brown (10YR 4/2) silt loam; massive; hard, firm, slightly sticky and nonplastic; few fine roots; compacted plowpan; mildly alkaline; abrupt smooth boundary.

Bw—11 to 28 inches; dark grayish brown (10YR 4/2) silty clay loam; few fine distinct dark yellowish brown (10YR 4/6) mottles and common fine faint dark gray (10YR 4/1) mottles; weak medium subangular blocky structure; hard, firm, sticky and slightly plastic; few fine roots; common pores and worm channels; mildly alkaline; gradual smooth boundary.

C1—28 to 45 inches; grayish brown (10YR 5/2) silt loam; many fine faint pale brown (10YR 6/3) mottles and few medium distinct dark yellowish brown (10YR 4/6) mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common pores and root channels; mildly alkaline; abrupt smooth boundary.

Ab—45 to 51 inches; dark grayish brown (10YR 4/2) silty clay loam; few medium faint dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots; common pores and root channels; mildly alkaline; clear smooth boundary.

C2—51 to 62 inches; dark grayish brown (10YR 4/2) silty clay loam; common medium faint grayish brown (10YR 5/2) mottles and few medium distinct dark yellowish brown (10YR 4/6) mottles; massive, hard, firm, sticky and plastic; mildly alkaline.

The solum ranges from 20 to 35 inches in thickness. The reaction is slightly acid to mildly alkaline.

The A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. In some pedons, the lower part of the A horizon is massive because of compaction. The texture is silty clay loam or silt loam.

Some pedons have a buried A horizon that has the same colors and textures as the A horizon.

The B horizon has hue of 10YR, value of 4 or 5, and chroma of 2. This horizon is mottled in shades of brown and gray. The texture is silty clay loam or silt loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. This horizon is mottled in shades of brown and gray. The texture is silt loam, loam, very fine sandy loam, or silty clay loam and is commonly stratified.

Convent Series

The Convent series consists of deep, nearly level, somewhat poorly drained soils that formed in recent silty alluvium. These soils are in low or depressional areas on the flood plains of streams that drain the loess uplands. The mapped areas are 5 to 150 acres. The

slopes range from 0 to 2 percent.

Convent soils are geographically associated with Adler, Arkabutla, and Rosebloom soils. Adler soils, are generally in a slightly higher position on the landscape than Convent soils and are moderately well drained. Arkabutla and Rosebloom soils are strongly acid and have 18 to 35 percent clay in the 10- to 40-inch control section. In addition, Rosebloom soils are poorly drained.

Typical pedon of Convent silt loam, occasionally flooded; 3.1 miles southeast of Henning on Henning-Orysa Road and 100 feet south of road in a cultivated field:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common very fine roots; slightly acid; clear smooth boundary.

C1—7 to 15 inches; grayish brown (10YR 5/2) silt loam; common medium faint brown (10YR 5/3) mottles and few fine distinct yellowish brown (10YR 5/6) mottles; massive; friable; few very fine roots; thin stratification; slightly acid; clear smooth boundary.

C2—15 to 32 inches; dark grayish brown (10YR 4/2) silt loam; many medium faint brown (10YR 5/3) mottles and few fine prominent reddish yellow (7.5YR 6/6) mottles; massive; friable; few fine roots; thin stratification; slightly acid; abrupt smooth boundary.

C3—32 to 62 inches; grayish brown (10YR 5/2) silt loam; common medium distinct brown (10YR 4/3) mottles and common medium faint gray (10YR 5/1) mottles; massive; friable; slightly acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 3. The texture is silt loam. The reaction ranges from medium acid to neutral in the surface layer, and it is slightly acid to neutral in the underlying material.

The C horizon has hue of 10YR, value of 4 or 5, and dominant chroma of 2. Some subhorizons of some pedons have chroma of 1 to 3. The C horizon has few to many mottles in shades of brown, gray, or red. The texture is silt loam.

Crevasse Series

The Crevasse series consists of nearly level to undulating, excessively drained soils that formed in sandy alluvium deposited by the Mississippi River. These soils are on natural levees adjacent to the Mississippi River. The slopes range from 0 to 5 percent

Crevasse soils are geographically associated with Bruno, Commerce, and Robinsonville soils. Bruno soils are in similar positions on the landscape as Crevasse soils and have strata that have a finer texture than loamy fine sand. Commerce soils are somewhat poorly drained and have a fine-silty control section. Robinsonville soils have a coarse-loamy control section.

Typical pedon of Crevasse loamy sand, occasionally flooded; 2.3 miles south of Keyes Point on Golddust Loop Road to a field road, 3,300 feet west to a cottonwood thicket, and 500 feet north:

Ap—0 to 7 inches; yellowish brown (10YR 5/4) loamy sand; single grained; loose; common fine roots; mildly alkaline; abrupt smooth boundary.

C1—7 to 20 inches; light yellowish brown (10YR 6/4) sand; single grained; loose; few fine roots; thin bedding planes; mildly alkaline; abrupt smooth boundary.

C2—20 to 65 inches; pale brown (10YR 6/3) fine sand; single grained; loose; few fine roots; thin bedding planes; few fine fragments of charcoal; mildly alkaline.

The reaction is medium acid to mildly alkaline in the A and C horizons.

The A horizon has hue of 10YR, value of 4, and chroma of 2 or 3; or hue of 10YR, value of 5, and chroma of 3 or 4. The texture is dominantly loamy sand but includes loamy fine sand, sandy loam, or fine sandy loam.

The C horizon has hue of 10YR, value of 4, and chroma of 2 or 3; hue of 10YR, value of 5 or 6, and chroma of 3 to 6; or hue of 2.5Y, value of 4 or 5, and chroma of 2. The texture is sand, fine sand, loamy sand, or loamy fine sand.

Dekoven Series

The Dekoven series consists of deep, nearly level, poorly drained soils that formed in loess and alluvium on low terraces and upland flats. These soils are on broad benches that border the flood plains of major streams. Most of these soils are in flat to depressional areas near the edge of the benches that join steeper uplands. The mapped areas are irregular in shape. The slopes range from 0 to 2 percent.

Dekoven soils are geographically associated with Center and Routon soils. Center soils are in slightly higher positions on the landscape than Dekoven soils, are somewhat poorly drained, and do not have a mollic epipedon. Routon soils are in similar positions but do not have a mollic epipedon.

Typical pedon of Dekoven silt loam, overwash, rarely

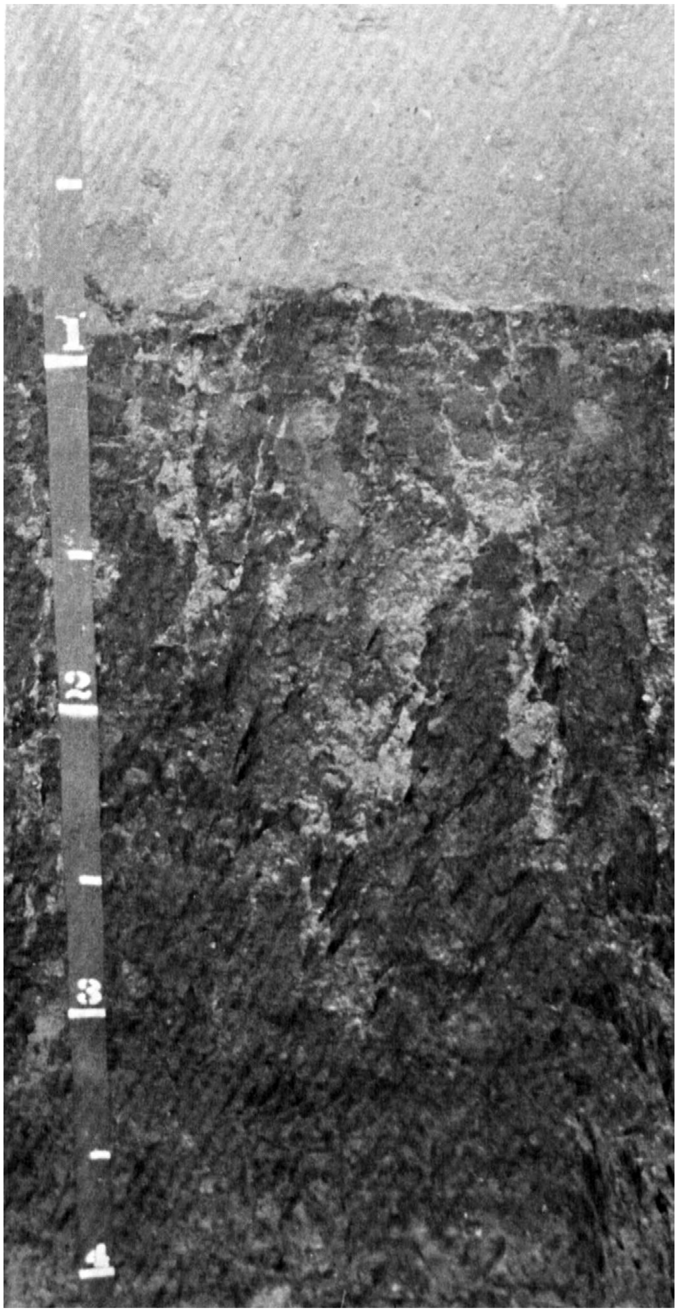


Figure 15.—In this profile of Dekoven silt loam, overwash, rarely flooded, the overwash material is underlain by a very dark gray and black old buried surface layer. Scale is in feet.

flooded (fig. 15); 0.7 mile north of Cane Creek bridge on old U.S. Highway 51, 15 miles west on a field road, and 689 feet south of railroad tracks in a cultivated field:

Ap—0 to 10 inches; brown (10YR 4/3) silt loam; moderate medium granular structure; friable; few fine roots; neutral; abrupt smooth boundary.

2A1—10 to 21 inches; very dark gray (10YR 3/1) silt loam, common fine faint very dark grayish brown (10YR 3/2) mottles; moderate medium subangular blocky structure; friable; common very fine roots; shiny ped faces; few fine manganese nodules; neutral; clear wavy boundary.

2A2—21 to 30 inches; black (10YR 2/1) silt loam; common medium faint very dark grayish brown (10YR 3/2) mottles; moderate medium subangular blocky structure; firm; common fine roots; common fine pores; shiny ped faces; few fine manganese nodules; neutral; gradual irregular boundary.

2Bg—30 to 42 inches; dark gray (10YR 4/1) silt loam; many medium faint very dark gray (10YR 3/1) mottles and few fine distinct brownish yellow (10YR 6/6) mottles; moderate medium and fine prismatic structure parting to weak medium subangular blocky; firm; common fine roots; few fine pores; shiny ped faces; few fine manganese nodules; neutral; gradual irregular boundary.

2BC—42 to 72 inches; light brownish gray (10YR 6/2) silt loam; many fine distinct brownish yellow (10YR 6/8) mottles and common medium dark gray (10YR 4/1) mottles; medium and coarse prismatic structure; friable; common fine pores; common fine manganese nodules; neutral.

The solum ranges from 35 to more than 72 inches in thickness. The thickness of the mollic epipedon is 15 to 23 inches. The thickness of the recent loess and alluvium ranges from 6 to 15 inches. The reaction ranges from slightly acid to mildly alkaline.

The Ap horizon, which consists of overwash material, has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. The texture is silt loam.

The 2A horizon has hue of 10YR, value of 2 or 3, and chroma of 2 or less. The texture is silt loam or silty clay loam.

The 2Bg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or less. The texture is silt loam or silty clay loam.

The 2BC horizon or 2C horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 or 2. The texture is silt loam or silty clay loam. Some pedons have a 2C horizon that has the same color and texture as the 2BC horizon.

Dubbs Series

The Dubbs series consists of deep, nearly level to gently sloping, and well drained soils that formed in old loamy alluvium. These soils are on low terraces along the flood plains of the Mississippi and Hatchie Rivers. On the Mississippi River terraces, these soils are between the old bed of the Forked Deer River and the loess bluffs in the northern end of the county. On the Hatchie River, they are in a higher position than Dubbs soil near the northern edge of the flood plain. The slopes range from 0 to 4 percent.

Dubbs soils are geographically associated with Askew and Dundee soils on the Mississippi River terraces and with Askew and Routon soils on the Hatchie River terraces. Askew soils are in similar or slightly lower positions on the landscape than Dubbs soils and have gray mottles in the upper 10 inches of the argillic horizon. Dundee soils are in lower positions and are somewhat poorly drained. These soils have an argillic horizon that is dominated by colors of chroma of 2. Routon soils are in lower positions and are poorly drained.

Typical pedon of Dubbs silt loam, occasionally flooded; 2,200 feet south of Henning-Orysa Road on Henry Moore Road, 4,250 feet south on a field road, 1,000 feet southwest in a cultivated field, and 100 feet north of the edge of the woods:

Ap—0 to 5 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; medium acid; abrupt smooth boundary.

BA—5 to 14 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint dark yellowish brown (10YR 3/4) mottles; moderate medium subangular blocky structure; friable; strongly acid; clear smooth boundary.

Bt1—14 to 22 inches; strong brown (7.5YR 4/6) silt loam; moderate medium subangular blocky structure; friable; thick continuous clay films; strongly acid; gradual smooth boundary.

Bt2—22 to 32 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; thick continous clay films; strongly acid; clear smooth boundary.

Bt3—32 to 42 inches; strong brown (7.5YR 4/6) silt loam; moderate medium subangular blocky structure; friable; thin patchy clay films; strongly acid; clear smooth boundary.

BC—42 to 50 inches; strong brown (7.5YR 5/6) loam; common medium faint yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; strongly acid; abrupt smooth boundary.

C—50 to 64 inches; dark yellowish brown (10YR 4/6) very fine sandy loam; massive; friable; medium acid.

The solum ranges from 40 to 55 inches in thickness. The reaction ranges from medium acid to very strongly acid.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. In some pedons, this horizon has value of 3 on ped faces but has value of 4 when crushed. The texture is loam or silt loam.

The BA horizon has hue of 10YR, value of 4, and chroma of 3 or 4. The texture is loam or silt loam. Some pedons do not have a BA horizon.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. Few to common brownish mottles are in some pedons. The texture is loam, silt loam, or silty clay loam.

The BC horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. This horizon has few to common brownish mottles. The texture is loam, silt loam, or fine sandy loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 4 or 6. The texture is loam, sandy loam, very fine sandy loam, loamy sand, or sand.

Dundee Series

The Dundee series consists of deep, nearly level, somewhat poorly drained soils that formed in old loamy alluvium. These soils have 5 to 20 inches of recent clayey alluvium on the surface. They are in broad areas on the Mississippi River flood plain. Most of these Dundee soils are between the old bed of the Forked Deer River and the loess bluffs in the northern part of the county. The slopes are 0 to 2 percent.

Dundee soils are geographically associated with Amagon, Dubbs, and Askew soils. Amagon soils are in lower positions on the landscape than Dundee soils and are poorly drained. Dubbs and Askew soils are in slightly higher positions. Dubbs soils are well drained and Askew soils are moderately well drained.

Typical pedon of Dundee silty clay, overwash, occasionally flooded; 3.2 miles west of Key Corner Road on Tennessee State Highway 88, 0.6 mile north on a field road, and 60 feet west of field road in a cultivated field:

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) silty clay; common medium faint dark brown (10YR 3/3) mottles; weak fine subangular blocky structure;

firm; many fine roots; slightly acid; abrupt smooth boundary.

C—5 to 17 inches; dark grayish brown (10YR 4/2) clay; common medium faint brown (10YR 4/3) mottles and few medium faint grayish brown (10YR 5/2) mottles; massive; firm; common fine roots; slightly acid; clear smooth boundary.

2A—17 to 22 inches; grayish brown (10YR 5/2) silt loam; common medium distinct strong brown (7.5YR 4/6) mottles and common medium distinct brown (10YR 4/3) mottles; weak medium subangular blocky structure parting to moderate fine granular; friable; common fine roots; medium acid; clear smooth boundary.

2Btg1—22 to 29 inches; grayish brown (10YR 5/2) silt loam; common medium distinct strong brown (7.5YR 4/6) mottles and common medium distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common very fine roots; many medium and fine pores; few thin patchy clay films; strongly acid; gradual wavy boundary.

2Btg2—29 to 43 inches; light brownish gray (10YR 6/2) silt loam; common medium prominent brown (7.5YR 5/4) mottles, common medium faint light gray (10YR 7/1) mottles, and common fine prominent strong brown (7.5YR 5/8) mottles; weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine and medium roots; common discontinuous clay films; strongly acid; gradual wavy boundary.

2Btg3—43 to 57 inches; light brownish gray (10YR 6/2) silt loam; common medium faint yellowish brown (10YR 5/4) mottles and common fine prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; friable; strongly acid; gradual smooth boundary.

2BC—57 to 62 inches; grayish brown (10YR 5/2) loam; many coarse prominent brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; friable; few thin clay films; very strongly acid.

The solum ranges from 35 to 60 inches in thickness. The thickness of recent clayey alluvium is 5 to 20 inches. The reaction is medium acid to very strongly acid except the overwash ranges from medium acid to slightly acid.

The Ap horizon has hue of 10YR, value of 3, and chroma of 2 or 3. The texture is silty clay, clay, or silty clay loam.

The C horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. This horizon is mottled in shades of gray or brown. The texture is clay, silty clay, or silty clay loam. Some pedons do not have a C horizon.

The 2A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. This horizon is mottled in shades of brown and red. The texture is loam, silt loam, or silty clay loam.

The 2Btg horizon dominantly has hue of 10YR, value of 4 or 5, and chroma of 2. This horizon is mottled in shades of gray, brown, and red. Some subhorizons in some pedons have hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The texture is silt loam, silty clay loam, loam, or very fine sandy loam.

The 2 BC horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. This horizon is mottled in shades of brown. The texture is loam, very fine sandy loam, or silty clay loam.

Some pedons have a C horizon that has hue of 10YR, value of 5 or 6, and chroma of 1 or 2. This horizon is mottled in shades of gray and brown. The texture is loam or very fine sandy loam.

Grenada Series

The Grenada series consists of deep, moderately well drained soils that have a compact, slowly permeable fragipan in the subsoil. These soils formed in thick loess deposits on the uplands. The slopes range from 2 to 8 percent.

Grenada soils are geographically associated with Loring and Calloway soils. Loring soils are in similar positions on the landscape as Grenada soils or are on slightly higher ridgetops. These soils do not have a leached, gray layer at the top of the fragipan. Calloway soils are in concave areas on the foot slopes. These soils are more gray in and above the fragipan than Grenada soils and are somewhat poorly drained.

Typical pedon of Grenada silt loam, 2 to 5 percent slopes, eroded (fig. 16); 1,600 feet southwest of Tennessee State Highway 19 on Arp-Lightfoot Road, south 950 feet on a dirt field road, and 125 feet directly west of the field road in a cultivated field:

Ap—0 to 6 inches; brown (10YR 5/3) silt loam; weak fine granular structure; friable; few fine roots; few black and brown concretions; neutral; abrupt smooth boundary.

Bw1—6 to 15 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles and few medium distinct light yellowish brown (10YR 6/4) mottles; weak medium subangular blocky structure; friable; common fine and very fine roots; common fine and very fine

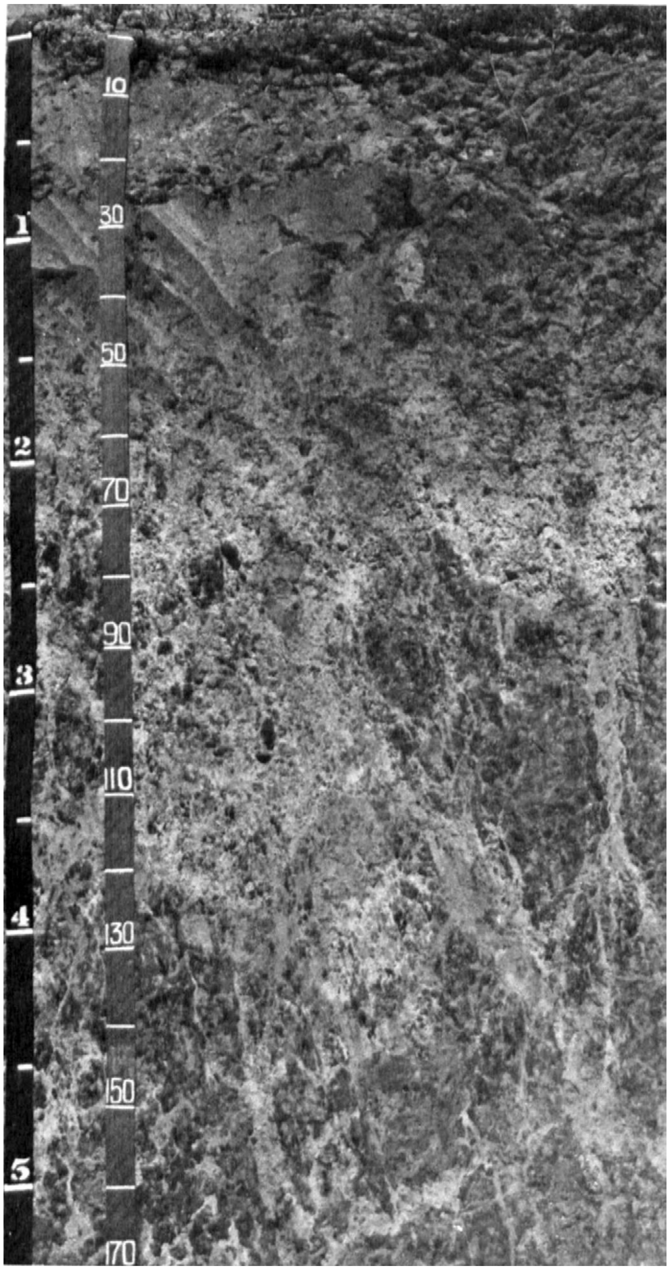


Figure 16.—In this profile of Grenada silt loam, 2 to 5 percent slopes, eroded, a light color leached zone is at a depth of about 20 inches and a fragipan is at a depth of 25 inches. The tapes are in feet and in centimeters.

pores; strongly acid; clear wavy boundary.

Bw2—15 to 20 inches; yellowish brown (10YR 5/4) silt loam; many medium distinct dark yellowish brown (10YR 4/4) mottles and common medium distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; common fine roots; many very fine pores; common fine black and brown stains and concretions; strongly acid; clear wavy boundary.

E/Bx—20 to 25 inches; light gray (10YR 7/2) silt; weak medium granular structure; very friable; many fine roots; common medium pores (E); yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; firm; common fine pores (Bx); few fine concretions; common medium brown and black iron and manganese stains; strongly acid; clear wavy boundary.

Btx1—25 to 47 inches; mottled dark brown (7.5YR 4/4), light brownish gray (10YR 6/2), and brown (10YR 5/3) silt loam; moderate coarse prismatic structure parting to weak medium subangular blocky; very firm; few fine roots between prisms; many fine and very fine pores; brittle; common brown and black iron and manganese stains; common silt tongues between prisms, thinning with depth; medium acid; gradual wavy boundary.

Btx2—47 to 60 inches; mottled brown (7.5YR 4/4), grayish brown (10YR 5/2), and yellowish brown (10YR 5/4) silt loam; moderate very coarse prismatic structure parting to weak medium subangular blocky; very firm; very few fine roots; patchy clay films on prism faces; brittle; medium acid.

The solum ranges from 45 to more than 60 inches in thickness. The reaction ranges from very strongly acid to medium acid in the Ap, Bw, E, and upper part of the Btx horizon except where lime has been added and from very strongly acid to slightly acid in the lower part of the Btx horizon. Depth to the fragipan ranges from about 17 to 34 inches; but in some pedons that are severely eroded, the fragipan is at a depth of less than 17 to 34 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. The texture is silt loam.

The Bw horizon has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. In some pedons, this horizon is mottled in shades of brown. The texture is silt loam.

The E part of the E/Bx horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2; or hue of 2.5Y, value of 5 or 6, and chroma of 2. The texture is silt or silt loam. The Bx part has the same colors as the Btx horizon. The texture is silt loam. In some pedons, this horizon is an E horizon without a significant part of the Bx horizon.

The Btx horizon has hue of 10YR, value of 4 or 5, and chroma of 3 to 6; or hue of 7.5YR, value of 4 or 5,

and chroma of 4. Mottles are in shades of brown and gray, and some of the subhorizons are mottled without a dominant color. The texture is dominantly silt loam but ranges from silt loam to light silty clay loam.

Keyespoint Series

The Keyespoint series consists of deep, nearly level, somewhat poorly drained soils that formed in beds of clayey sediment underlain by loamy sediment on the flood plain of the Mississippi River. The slopes are dominantly 0 to 2 percent but range from 0 to 5 percent in a few areas.

Keyespoint soils are geographically associated with Tunica, Sharkey, Openlake, and Commerce soils. Tunica soils are in similar positions on the landscape or in lower-lying positions than Keyespoint soils, are poorly drained, and have colors in the B horizon that are dominantly chroma of 1. Sharkey soils are in lower-lying positions, are poorly drained, and do not have a loamy textured horizon within 40 inches of the surface. Openlake soils are in similar positions as Keyespoint soils and have a fine particle-size control section. Commerce soils are on natural levees that are nearer the river channel and have a fine-silty particle-size control section.

Typical pedon of Keyespoint silty clay, occasionally flooded; 4.6 miles west of Golddust Church on Crutcher's Lake Road to a field road, 1.5 miles east on the field road to a metal post, 175 feet east of post, and 20 feet north of a field road:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay, grayish brown (10YR 5/2) dry; moderate fine granular structure; very hard, very firm, very sticky and very plastic; few fine roots; neutral; abrupt smooth boundary.

Bg1—8 to 18 inches; dark grayish brown (10YR 4/2) silty clay; common fine distinct strong brown (7.5YR 4/6) and dark brown (7.5YR 3/4) mottles and few fine faint dark gray mottles; moderate medium and fine subangular blocky structure; very firm; very plastic and very sticky; few fine roots; common worm holes and casts; neutral, clear smooth boundary.

Bg2—18 to 30 inches; dark grayish brown (10YR 4/2) clay; common fine faint dark gray (10YR 4/1) mottles and common fine distinct strong brown (7.5YR 4/6) and dark brown (7.5YR 3/4) mottles; strong medium and fine subangular blocky structure; very firm, very plastic and very sticky, few fine roots; common worm holes and casts; few nonintersecting slickensides; neutral; clear smooth boundary.

2C1—30 to 62 inches; brown (10YR 5/3) silt loam; many medium faint grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) mottles and common medium distinct dark brown (7.5YR 4/4) mottles; massive; friable; slightly sticky and nonplastic; few fine roots; common worm holes and casts; mildly alkaline.

2C2—62 to 72 inches; brown (10YR 5/3) loamy fine sand; single grained; loose; nonsticky and nonplastic; mildly alkaline.

The thickness of the solum and depth to the loamy horizons range from 24 to 40 inches. Cracks as much as 3/4 inch wide develop to a depth of 20 inches or more in most years. The reaction ranges from mildly alkaline to medium acid.

The A horizon has hue of 10YR, dominant value of 3, and chroma of 2; and it rarely has value of 4 and chroma of 2. The texture is silty clay, clay, or silty clay loam.

The Bg horizon has hue of 10YR, value of 4 or 5, and chroma of 2. Mottles are few to many in shades of brown, red, or gray. The texture is silty clay or clay. Thin subhorizons in a few pedons are silty clay loam or silt loam.

The 2C horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or 3. Mottles are few to many in shades of brown and gray. The texture is silt loam, loam, very fine sandy loam, fine sandy loam, sandy loam, clay loam, or silty clay loam. Subhorizons of loamy fine sand, loamy sand, or sand are at a depth of more than 50 inches in some pedons.

Loring Series

The Loring series consists of deep, moderately well drained soils that formed in thick loess deposits on the uplands. These soils have a compact, slowly permeable fragipan in the subsoil. The slopes range from 2 to 12 percent.

Loring soils are geographically associated with Memphis, Grenada, and Calloway soils. Memphis soils are on higher ridgetops than Loring soils, are well drained, and do not have a fragipan. Grenada soils are on adjacent or lower-lying side slopes and have a leached, gray layer at the top of the fragipan. Calloway soils are in depressional areas and on foot slopes, are more gray in and above the fragipan, and are somewhat poorly drained.

Typical pedon of Loring silt loam, 5 to 8 percent

slopes, eroded; 1.1 miles north of Durhamville on Durhamville Road, 0.6 mile west on a gravel road, 75 feet south of gravel road, and 150 feet north of pond in a cultivated field:

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak, medium granular structure; friable; common fine roots; neutral; abrupt smooth boundary.

Bt1—7 to 16 inches; dark yellowish brown (10YR 4/4) silt loam; dark brown (7.5YR 4/4) coatings on ped faces; few medium faint yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine roots; thin patchy clay films on ped faces and in pores; few black manganese stains, few fine pores; strongly acid; clear, smooth boundary.

Bt2—16 to 24 inches; dark yellowish brown (10YR 4/4) silt loam; dark brown (7.5YR 4/4) coatings on ped faces; common medium faint yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; friable; common fine roots, few fine pores; thin patchy clay on ped faces and in pores; strongly acid; gradual wavy boundary.

Btx1—24 to 36 inches; dark yellowish brown (10YR 4/4) silt loam; common medium distinct light olive brown (2.5Y 5.4) and light brownish gray (2.5Y 6/2) mottles; moderate coarse prismatic structure parting to weak subangular blocky; firm; few fine roots between prisms; common fine pores; thin clay films on faces of prisms and patchy clay films on secondary peds and in pores; many black manganese stains on faces of prisms; compact and brittle, about 60 percent of the mass; strongly acid; gradual wavy boundary

Btx2—36 to 62 inches; dark brown (7.5YR 4/4) silt loam; common medium distinct light brownish gray (2.5Y 6/2) and yellowish brown (10YR 5/6) mottles; light gray silt coatings on faces of prisms and in seams between prisms; weak very coarse prismatic structure parting to weak medium subangular blocky; firm; few fine roots in seams between prisms; many fine and medium pores; thick clay films on faces of some prisms, thin patchy clay films on secondary peds; common black manganese stains on faces of prisms; compact and brittle, about 70 percent of the mass; strongly acid.

The solum ranges from 45 to 70 inches in thickness. The reaction is medium acid or strongly acid except where lime has been added. Depth to the fragipan ranges from about 20 to 30 inches; but in some severely eroded areas, the fragipan is at a depth of less than 20 to 30 inches.

The Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4.

The Bt horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 4 or 6. In some pedons, the lower part of this horizon is mottled in shades of brown and gray. The texture is silt loam or silty clay loam.

The Btx horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 or 6. Mottles are in shades of brown and gray. The texture is silt loam. Some pedons have a BC horizon that has the same colors and texture as the Btx horizon.

Memphis Series

The Memphis series consists of deep, well drained soils that formed in thick loess deposits. These soils are on ridgetops and side slopes in steep, highly dissected uplands and on ridgetops on rolling uplands. The slopes range from 2 to 40 percent.

Memphis soils are geographically associated with Loring and Grenada soils. Loring and Grenada soils are on adjacent side slopes, are moderately well drained, and have a fragipan.

Typical pedon of Memphis silt loam, 5 to 8 percent slopes, eroded; 1.5 miles northwest of Edith, 150 feet south of the Edith-Bluff Road, and 300 feet east of a radio tower in a cultivated field:

Ap—0 to 6 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine subangular blocky and weak medium granular structure; friable; common fine roots; few fine black stains on peds; neutral; abrupt smooth boundary.

Bt1—6 to 24 inches; dark brown (7.5YR 4/4) silt loam; moderate medium subangular blocky structure; friable; common fine roots; few fine pores; many thin discontinuous clay films; few black manganese stains and accumulations; strongly acid; gradual smooth boundary.

B2t—24 to 40 inches; dark brown (7.5YR 4/4) silt loam; common light gray (10YR 7/2) silt streaks between peds and in cracks; moderate medium and coarse subangular blocky structure; friable; common fine roots; few fine pores; common thin discontinuous clay films; few fine black manganese stains and accumulations; strongly acid; gradual smooth boundary.

BC—40 to 56 inches; dark brown (7.5YR 4/4) silt loam; many light gray (10YR 7/2) silt streaks between peds and in cracks; weak coarse and medium subangular blocky structure; friable; few fine roots; common fine pores; few thin patchy clay films; strongly acid; diffuse smooth boundary.

C—56 to 62 inches; dark brown (7.5YR 4/4) silt loam; common light gray (10YR 7/2) silt streaks in cracks; massive; friable; common fine pores; few fine roots; strongly acid.

The solum ranges from 32 to 65 inches in thickness. The reaction ranges from medium acid to strongly acid except where lime has been added.

The A horizon has hue of 7.5YR or 10YR, value of 4, and chroma of 3 or 4. In wooded areas, some pedons have a thin A1 horizon that has hue of 10YR, value of 3, and chroma of 2. The texture is silt loam.

Some pedons have a BA horizon that has hue of 10YR or 7.5YR, value of 4, and chroma of 4 or 6. The texture is silt loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 4, and chroma of 4 to 6. Most pedons have few to many light gray silt streaks on faces of peds. A few brownish mottles are in some pedons. The texture is mostly silt loam, but it ranges from silt loam to silty clay loam. Most pedons have a BC horizon that has color and textures similar to those in the Bt horizon.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4. Few to many gray silt streaks are in most pedons. Few to common brownish mottles are in some pedons.

Morganfield Series

The Morganfield series consists of deep, nearly level, well drained, moderately permeable soils that formed in thick deposits of recent alluvium. These soils are on the flood plains and in narrow drainageways. The slopes range from 0 to 2 percent.

Morganfield soils are geographically associated with Adler, Memphis, and Loring soils. Adler soils are in similar positions on the landscape as Morganfield soils and are moderately well drained. Memphis and Loring soils are on uplands adjacent to the Morganfield soils and have an argillic horizon. In addition, Loring soils have a fragipan.

Typical pedon of Morganfield silt loam, occasionally flooded; 4,600 feet west and 1 mile north of intersection of Tennessee State Highway 87 and U.S. Highway 51, 260 feet north of road, and 150 feet west of creek bank in a cultivated field:

Ap—0 to 9 inches; dark brown (10YR 4/3) silt loam; weak fine subangular and weak medium granular structure; friable; few fine and medium roots; neutral; abrupt smooth boundary.

C1—9 to 16 inches; dark brown (10YR 4/3) silt loam; few medium faint yellowish brown (10YR 5/4) and brown (10YR 5/3) mottles; massive; friable; few fine and medium roots; few fine pores; discontinuous bedding planes; neutral; abrupt smooth boundary.

C2—16 to 37 inches; dark brown (10YR 4/3) silt loam; many medium faint brown (10YR 5/3) mottles and few fine faint dark brown (7.5YR 4/4) mottles; massive; friable; few fine roots; few fine pores; thin bedding planes; neutral; gradual smooth boundary.

C3—37 to 60 inches; mottled brown (10YR 5/3), grayish brown (2.5Y 5/2), and dark brown (10YR 4/3) silt loam; massive; friable; many dark brown and black stains; neutral.

The reaction ranges from medium acid to mildly alkaline in the Ap and C horizons.

The Ap horizon has hue of 10YR, value of 4, and chroma of 3 or 4. The texture is silt loam.

The C horizon to a depth of 40 inches has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Some pedons have brownish mottles in the upper 20 inches and mottles in shades of brown and gray at a depth of more than 20 inches. The C horizon at a depth of more than 40 inches has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 to 4. The texture is silt loam.

Some pedons have a buried A horizon at a depth of more than 20 inches that has the same color as the Ap horizon.

Oaklimeter Series

The Oaklimeter series consists of deep, nearly level, moderately well drained soils that formed in silty alluvium on the Hatchie River flood plain. They are on broad, slightly convex, old, natural levees. These soils are mapped with Amagon overwash soils. The slopes range from 0 to 2 percent.

Oaklimeter soils are geographically associated with Amagon overwash, Adler, and Rosebloom soils. Amagon overwash soils are in slightly lower and flatter positions on the landscape than Oaklimeter soils, are poorly drained, and have matrix colors of chroma of 2 or less within 20 inches of the surface. Adler soils are near loess uplands or near tributary streams that run into the Hatchie River. These soils have bedding plains in the upper 20 inches and are less acid than Oaklimeter soils. Rosebloom soils are in depressional areas and are poorly drained.

Typical pedon of Oaklimeter silt loam, in an area of Amagon overwash and Oaklimeter silt loams, frequently flooded; 1.1 miles south of Pleasant Hill on McFarland Road, 3,200 feet south on a field road to the edge of the woods, 1,600 feet southwest along a drainage ditch

to its junction with a slough, 250 feet east along the slough, and 45 feet north of the slough:

A—0 to 8 inches; dark brown (10YR 4/3) silt loam; few fine faint dark brown (7.5YR 4/4) mottles; moderate medium granular structure; friable; common fine roots; faint bedding plains in places; strongly acid; clear smooth boundary.

Bw1—8 to 16 inches; dark brown (7.5YR 4/4) silt loam; common medium faint dark brown (10YR 3/3) mottles and few medium faint brown (10YR 5/3) and grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; friable; many medium and coarse roots; common pores; strongly acid; clear smooth boundary.

Bw2—16 to 35 inches; dark brown (10YR 4/3) silt loam; common fine faint pale brown (10YR 6/4), dark brown (10YR 3/3), and light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; common medium and fine roots; many manganese nodules; very strongly acid; clear smooth boundary.

E/Bb—35 to 54 inches; light gray (10YR 7/2) silt loam; common fine distinct dark yellowish brown (10YR 4/4) mottles (E); yellowish brown (10YR 5/4) silt loam (B); weak medium prismatic structure parting to weak medium subangular blocky; friable; few fine roots; many medium pores; many manganese nodules; very strongly acid; clear wavy boundary.

Btgb—54 to 72 inches; grayish brown (10YR 5/2) silt loam; many fine faint yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/6) mottles; weak medium prismatic structure parting to weak medium subangular blocky; firm; few fine pores; common thin clay films; many manganese nodules; strongly acid.

Depth to the surface of the buried soil horizon ranges from 20 to 40 inches. The reaction is strongly acid or very strongly acid.

The A horizon has hue of 10YR, value of 4, and chroma of 2 to 4. The texture is silt loam.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. This horizon has few or common grayish brown and light brownish gray mottles at a depth of less than 20 inches. The texture is dominantly silt loam. Thin subhorizons of silty clay loam, fine sandy loam, or loam are in some pedons.

The Eb and Btgb horizons have hue of 10YR, value of 5 to 7, and chroma of 1 or 2; or hue of 2.5Y, value of 5 or 6, and chroma of 2. These horizons are mottled in shades of brown, gray, or red. The texture of the Eb horizon is silt loam, and the texture of the Btgb horizon is silt loam or silty clay loam.

Openlake Series

The Openlake series consists of nearly level, somewhat poorly drained soils that formed in clayey alluvium on the flood plain of the Mississippi River. The slopes are dominantly 0 to 2 percent but range from 0 to 5 percent in a few areas.

Openlake soils are geographically associated with Commerce, Keyespoint, Sharkey, and Tunica soils. Commerce soils have a fine-silty particle-size control section and are in higher positions on the landscape than Openlake soils. Keyespoint soils are in similar positions as Openlake soils and are underlain by loamy textured layers at a depth of 20 to 40 inches. Sharkey soils are in low slack-water areas and are poorly drained. Tunica soils are poorly drained and are underlain by loamy textured layers at a depth of 20 to 40 inches.

Typical pedon of Openlake silty clay, occasionally flooded; 1.1 miles south of Tennessee State Highway 19 on Conner Road, 3,600 feet west on Daniels Road, and 850 feet north in a cultivated field:

Ap1—0 to 5 inches; very dark grayish brown (10YR 3/2) silty clay; moderate fine granular structure; firm, plastic and sticky; common fine roots; slightly acid; abrupt smooth boundary.

Ap2—5 to 7 inches; very dark grayish brown (10YR 3/2) silty clay; few fine faint brown mottles; weak medium angular blocky structure; very firm, plastic and sticky; few fine roots; slightly acid; abrupt smooth boundary.

Bg1—7 to 13 inches; dark grayish brown (10YR 4/2) clay; common fine distinct brown (7.5YR 4/4) mottles and few fine faint gray mottles; weak medium and fine subangular blocky structure; very firm, plastic and sticky; few fine roots; shiny ped faces; very few nonintersecting slickensides; slightly acid; gradual smooth boundary.

Bg2—13 to 26 inches; dark grayish brown (10YR 4/2) silty clay; common fine distinct brown (10YR 4/3) and dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure parting to moderate fine subangular blocky; very firm, very plastic and very sticky; few fine roots; shiny ped faces; very few nonintersecting slickensides; slightly acid; gradual smooth boundary.

Bg3—26 to 43 inches; dark grayish brown (10YR 4/2)

silty clay; dark gray (10YR 4/1) ped faces; common medium faint brown (10YR 4/3) and very dark grayish brown (10YR 3/2) mottles; strong medium subangular blocky structure parting to moderate fine subangular blocky; very firm, very plastic and very sticky: few fine roots; shiny ped faces; few nonintersecting slickensides; slightly acid; diffuse smooth boundary.

Bg4—43 to 68 inches; dark grayish brown (10YR 4/2) silty clay, dark gray (10YR 4/1) ped faces; common fine distinct brown (10YR 4/3) and dark yellowish brown (10YR 4/4) mottles; strong medium subangular blocky structure parting to moderate fine subangular blocky; very firm, very plastic and very sticky; few fine roots; shiny ped faces; few nonintersecting slickensides; neutral; diffuse smooth boundary.

Cg—68 to 75 inches; gray (10YR 5/1) clay; common fine distinct dark yellowish brown (10YR 4/4) mottles; massive; very firm, very plastic and very sticky; neutral.

The thickness of the solum ranges from 37 to 80 inches. Cracks that are 1 to 2 centimeters wide develop to a depth of 50 to 75 centimeters in most years.

The A horizon has hue of 10YR or 2.5Y, value of 3 or 4, and chroma of 1 or 2. The texture is silty clay, clay, or silty clay loam. The reaction is strongly acid to mildly alkaline.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2. This horizon has few to many mottles in shades of brown and red. Some subhorizons have chroma of 1 at a depth of more than 30 inches. Thin subhorizons that have chroma of 3 are in some pedons. The texture is silty clay or clay. Thin subhorizons in some pedons are silty clay loam or silt loam. Consistence is firm or very firm. The reaction is strongly acid to mildly alkaline, but at least one subhorizon is less acid than strongly acid.

Some pedons have a buried A horizon that has hue of 10YR, value of 3 or 4, and chroma of 1 or 2. The texture is clay, silty clay, or silty clay loam. The reaction is strongly acid to mildly alkaline.

The Cg horizon has hue of 10YR, 2.5Y or 5Y, value of 4 to 6, and chroma of 1 or 2; or it is neutral and has value of 4 to 6. Mottles are none to many in shades of brown and red. The texture is typically clay or silty clay, but some pedons have coarser textures at a depth of more than 40 inches. The reaction is medium acid to mildly alkaline.

Robinsonville Series

The Robinsonville series consists of deep, nearly level, well drained soils that formed in loamy alluvium deposited by the Mississippi River. These soils are on natural levees on the flood plain of the Mississippi River. The slopes range from 0 to 3 percent.

Robinsonville soils are geographically associated with Commerce, Crevasse, and Bruno soils. Commerce soils are in similar or slightly lower positions on the flood plain than Robinsonville soils, are somewhat poorly drained, and have a fine-silty particle-size control section. Crevasse and Bruno soils are in similar positions as Robinsonville soils, are excessively drained, and have a sandy particle-size control section.

Typical pedon of Robinsonville fine sandy loam, occasionally flooded; 2.5 miles southwest of Ashport Store on Tennessee State Highway 19, 50 feet northwest of the highway, and 100 yards east of an old house in a cultivated field:

Ap—0 to 7 inches; brown (10YR 4/3) fine sandy loam; weak fine granular structure; very friable; common fine roots; mildly alkaline; abrupt smooth boundary.

C1—7 to 18 inches; brown (10YR 4/3) very fine sandy loam; massive; very friable; common fine roots; mildly alkaline; abrupt smooth boundary.

C2—18 to 29 inches; yellowish brown (10YR 5/4) loamy fine sand; single grained; loose; few fine roots; mildly alkaline; abrupt smooth boundary.

C3—29 to 48 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; many medium faint brown (10YR 5/3) mottles and common fine faint strong brown (7.5YR 4/6) mottles; massive; very friable; few fine roots; mildly alkaline; abrupt smooth boundary.

C4—48 to 53 inches; dark grayish brown (10YR 4/2) silt loam; common medium faint (10YR 3/2) mottles; massive; friable; mildly alkaline; abrupt smooth boundary.

C5—53 to 62 inches; dark yellowish brown (10YR 4/4) very fine sandy loam; many medium distinct grayish brown (10YR 5/2) mottles and common fine faint strong brown (7.5YR 4/6) mottles; massive; friable; mildly alkaline.

The reaction is slightly acid to mildly alkaline in the A and C horizons.

The A horizon has hue of 10YR, value of 4, and chroma of 2 or 3; or a horizon that is less than 6 inches thick has value of 3 and chroma of 2 or 3. The texture

is fine sandy loam, very fine sandy loam, or silt loam. In addition, some areas have a layer of silty clay loam overwash alluvium about 4 to 12 inches thick that has the same colors as the A horizon.

The C horizon is at a depth of more than 52 inches. It has hue of 10YR, value of 4 and, chroma of 2 to 4; or hue of 10YR, value of 5 or 6, and chroma of 3 or 4. The texture is stratified fine sandy loam, silt loam, very fine sandy loam, loamy fine sand, or loamy very fine sand. Some pedons are mottled in shades of brown and gray. Mottles of chroma of 2 or less are at a depth of more than 20 inches.

Rosebloom Series

The Rosebloom series consists of deep, nearly level, poorly drained soils that formed in silty alluvium. These soils are mainly in low slack-water areas on the Forked Deer River flood plain. The mapped areas are 10 to 300 acres. The slopes range from 0 to 2 percent.

Rosebloom soils are geographically associated with Arkabutla, Convent, and Adler soils. Arkabutla and Convent soils are in slightly higher positions on the landscape than Rosebloom soils and are more brown in the upper 20 inches. In addition, Convent soils are medium acid to neutral and have a coarse-silty control section. Adler soils are in higher positions near stream channels than Rosebloom soils and do not have colors of chroma of 2 or less dominant in the upper 20 inches. These soils are medium acid to neutral and have a coarse-silty control section.

Typical pedon of Rosebloom silt loam, frequently flooded; 1.1 miles north of Twin Rivers Road on Forked Deer River Levee Road, 0.6 mile west of the Forked Deer River channel on a drainage ditch levee road, and 500 feet south in a cultivated field:

Ap—0 to 5 inches; brown (10YR 4/3) silt loam; weak fine granular structure; friable; common fine roots; strongly acid; abrupt smooth boundary.

Bg1—5 to 19 inches; dark gray (10YR 4/1) silty clay loam; many coarse distinct dark red (2.5YR 3/6) mottles, common medium distinct yellowish red (5YR 4/6) mottles, and few fine faint gray mottles; weak coarse subangular blocky structure; firm; common fine roots; few fine pores; few charcoal fragments; very strongly acid; clear smooth boundary.

Bg2—19 to 29 inches; gray (10YR 5/1) silt loam; common coarse distinct dark red (2.5YR 3/6) mottles and common medium distinct yellowish red (5YR 4/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores, few fine charcoal fragments; very strongly acid; gradual smooth boundary.

Bg3—29 to 41 inches; gray (10YR 5/1) silt loam, common fine prominent dark yellowish brown (10YR 4/6) mottles and few fine distinct dark red (2.5YR 3/6) mottles; weak medium subangular blocky structure; friable; few fine roots; few fine pores; strongly acid; gradual wavy boundary.

Bg4—41 to 72 inches; gray (10YR 5/1) silty clay loam; common medium prominent yellowish brown (10YR 5/8) mottles, common medium faint gray (N 5/0) mottles, and few fine distinct dark red (2.5YR 3/6) mottles; weak medium subangular blocky structure; friable; few fine pores; few black manganese stains; few iron and manganese concretions: strongly acid.

The solum ranges from 40 to more than 72 inches in thickness. The reaction is strongly acid or very strongly acid except where lime has been added.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3. The texture is dominantly silt loam but includes silty clay loam.

The Bg horizon has hue of 10YR, value of 4 to 6, and chroma of 1; or hue of 10YR, value of 6, and chroma of 2. Few to many mottles are in shades of brown and red. The texture is silt loam or silty clay loam.

Routon Series

The Routon series consists of deep, poorly drained, slowly permeable soils that formed in loess or silty old alluvium. These soils are in broad, flat areas, in depressional areas at the head of drainageways on loess uplands, and in nearly level, low-lying positions on the Hatchie River flood plain. These soils are also on low terraces adjacent to loess uplands in association with major streams. The slopes are long and flat to slightly concave and range from 0 to 2 percent.

Routon soils are geographically associated with Calloway, Center, and Grenada soils on the loess uplands and stream terraces and with Askew and Dubbs soils on low terraces along the Hatchie River. Calloway soils are somewhat poorly drained and have a fragipan. Center soils are somewhat poorly drained. Grenada soils are moderately well drained and have a fragipan. Askew and Dubbs soils are in slightly higher positions on the landscape than Routon soils. In addition, Askew soils are moderately well drained, and Dubbs soils are well drained.

Typical pedon of Routon silt loam; 6,220 feet

southwest of Tennessee State Highway 19 on Arp-Lightfoot Road and north 1,175 feet in a cultivated field:

Ap—0 to 7 inches; brown (10YR 5/3) silt loam, weak medium granular and fine subangular blocky structure; friable; few fine roots; few fine and medium manganese nodules; slightly acid; abrupt smooth boundary.

Eg—7 to 15 inches; light brownish gray (2.5Y 6/2) silt loam; common medium faint brown (10YR 5/3) mottles and few fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; few fine roots; few fine pores; common fine black nodules; strongly acid; clear smooth boundary.

Btg1—15 to 24 inches; light brownish gray (2.5Y 6/2) silty clay loam; common medium distinct brown (10YR 5/3) mottles and few fine prominent strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common fine roots; few fine pores; discontinuous clay films; common fine and medium black nodules; strongly acid; clear smooth boundary.

Btg2—24 to 45 inches; light brownish gray (2.5Y 6/2) silt loam; common medium distinct brown (10YR 5/3) mottles and few fine prominent strong brown (7.5YR 5/8) mottles; moderate medium prismatic structure parting to weak medium subangular blocky; firm; common fine roots; thin discontinuous clay films; many fine and medium black nodules; medium acid; gradual smooth boundary.

BC—45 to 56 inches; light brownish gray (2.5Y 6/2) silt loam; common medium distinct brown (10YR 5/3) mottles and few fine prominent strong brown (7.5YR 5/8) mottles; weak coarse prismatic structure; firm; few fine roots; common fine and very fine pores; common medium concretions; slightly acid; gradual smooth boundary.

C—56 to 72 inches; grayish brown (2.5Y 5/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles and few fine prominent strong brown (7.5YR 5/6) mottles; massive; friable; common very fine pores; few soft black concretions; neutral.

The solum ranges from 45 to 65 inches in thickness. The reaction in the upper part of the solum ranges from strongly acid to slightly acid. It ranges from medium acid to neutral in the BC and C horizons. Some pedons have 10 to 20 inches of recent alluvium on the surface.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 or 3, but the A horizon, which formed in recent alluvium, also has chroma of 4. The texture is silt loam.

Some pedons have a Bw or C horizon that formed in recent alluvium. It has hue of 10YR, value of 4 to 6, and chroma of 2 or 4; or hue of 7.5YR, value of 4, and chroma of 4. Mottles are few to many in shades of brown, gray, or red. The texture is silt loam.

The Eg horizon has hue of 10YR, value of 5 to 7, and chroma of 1; or hue of 10YR or 2.5Y, value of 6 or 7, and chroma of 2. Mottles of higher chroma range from few to common. The texture is silt loam or silt.

The Btg horizon has hue of 10YR or 2.5Y, value of 6, and chroma of 1 or 2; or hue of 10YR, value of 5, and chroma of 1. The BC horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2. Mottles in the Btg and BC horizons range from few to many in shades of brown. The texture is silt loam or silty clay loam.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 6. Mottles are in shades of brown and gray.

Sharkey Series

The Sharkey series consists of deep, nearly level, poorly drained soils that formed in clayey alluvium in slack-water areas on the Mississippi River flood plain. The slopes range from 0 to 2 percent.

Sharkey soils are geographically associated with Bowdre, Keyespoint, Openlake, and Tunica soils. Bowdre and Keyespoint soils generally are in higher positions on the landscape than Sharkey soils and are somewhat poorly drained. In addition, Bowdre soils have loamy textured layers at a depth of 12 to 20 inches, and Keyespoint soils have loamy layers at a depth of 20 to 40 inches. Openlake soils are somewhat poorly drained and have chroma of 2 in the subsoil. Tunica soils are in similar positions as Sharkey soils and are underlain by loamy layers at a depth of 20 to 40 inches.

Typical pedon of Sharkey clay, frequently flooded; 3.1 miles southeast of Tennessee State Highway 19 on Jones Slough Road, 625 feet north on a field road to a cultivated field, 50 feet east of the field road, and 40 feet north of a ditch on the southern edge of a field:

Ap—0 to 5 inches; very dark grayish brown (10YR 3/2) clay; weak fine granular structure; very hard, firm, sticky and plastic; common fine roots; slightly acid; abrupt wavy boundary.

Bg1—5 to 14 inches; dark gray (10YR 4/1) clay; many medium distinct strong brown (7.5YR 4/6) and dark

yellowish brown (10YR 4/4) mottles; moderate medium and fine angular blocky structure; very firm, very plastic and very sticky; common fine roots; few fine pores; common slickensides; shiny faces on peds; few fine white snail shell fragments; mildly alkaline, diffuse smooth boundary.

Bg2—14 to 27 inches; gray (10YR 5/1) clay; common medium distinct strong brown (7.5YR 4/6) and dark yellowish brown (10YR 4/4) mottles; strong medium and fine angular blocky structure; very firm; very plastic and very sticky; few fine roots; few fine pores; common slickensides; shiny faces on peds; mildly alkaline; diffuse smooth boundary.

Bg3—27 to 43 inches; dark gray (10YR 4/1) clay; many medium distinct dark yellowish brown (10YR 4/4) mottles, common medium distinct strong brown (7.5YR 4/6) mottles, and few fine prominent red (10YR 4/6) mottles; strong medium and fine angular blocky structure; very firm, very plastic and very sticky; few fine roots; few very fine pores; common slickesides; shiny faces on peds; many white powdery snail shell fragments; mildly alkaline; diffuse smooth boundary.

Bg4—43 to 60 inches; gray (10YR 5/1) clay; common medium distinct dark yellowish brown (10YR 4/4) and strong brown (7.5YR 4/6) mottles and few fine prominent red (10YR 4/6) mottles; weak medium angular blocky structure parting to moderate fine angular blocky; very firm, very sticky, very plastic; few fine roots; few very fine pores; few slickensides, shiny faces on peds; few powdery shell fragments; mildly alkaline.

The solum ranges from 40 to 60 inches in thickness. The reaction ranges from medium acid to mildly alkaline.

The A horizon has hue of 10YR, value of 3, and chroma of 1 or 2. The texture is clay.

The Bg horizon has hue of 10YR, value of 4 or 5, and chroma of 1; or it is neutral and has value of 5, or has value of 4. Mottles are few to many in shades of brown, yellow, and red. The texture is clay, but thin subhorizons of silty clay loam or silt loam are in some pedons.

Some pedons have a C horizon that has the same colors as those in the Bg horizon. The texture is clay, but some pedons have a coarser texture at a depth of more than 40 inches.

Tunica Series

The Tunica series consists of deep, nearly level, poorly drained soils that formed in sediment that consists of layers of clayey alluvium underlain by layers of loamy alluvium. Tunica soils are in flat, depressional, slack-water areas on the Mississippi River flood plain. The slopes range from 2 percent.

Tunica soils are geographically associated with Sharkey, Keyespoint, and Bowdre soils. Sharkey soils are in similar positions on the landscape as Tunica soils but have clay texture to a depth of more than 40 inches. Keyespoint and Bowdre soils generally are in higher positions than Tunica soils and are somewhat poorly drained. In addition, Bowdre soils have loamy textured layers at a depth of 12 to 20 inches.

Typical pedon of Tunica clay, frequently flooded; 2,300 feet south of Coker Slough bridge on upper Anderson-Tully Road, 550 feet west on a logging road, and 50 feet south of the logging road in a wooded area in the Anderson-Tully Wildlife Management Area:

O—3 to 0 inches; loose undecomposed and decomposed leaf and twig litter from hardwood forest.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) clay; common medium distinct brown (7.5YR 4/4) and dark yellowish brown (10YR 4/4) mottles; moderate fine subangular blocky and moderate medium granular structure; firm; common medium and fine roots; mildly alkaline; clear smooth boundary.

Bg1—4 to 15 inches; dark gray (10YR 4/1) clay; many medium distinct dark yellowish brown (10YR 4/4) mottles, common medium distinct strong brown (7.5YR 4/6) mottles, and few fine prominent reddish brown (5YR 4/4) mottles; moderate coarse angular blocky structure parting to weak medium subangular blocky; firm; common medium and coarse roots; few fine pores, common fine black manganese and iron accumulations; mildly alkaline; gradual wavy boundary.

Bg2—15 to 30 inches; dark gray (10YR 4/1) clay; common medium distinct brown (7.5YR 4/4) and strong brown (7.5YR 4/6) mottles and few fine prominent dark reddish brown (5YR 3/4) mottles; strong medium subangular blocky structure; very firm; few coarse common medium roots; common fine and very fine pores; shiny faces on peds; mildly alkaline; clear wavy boundary.

2C1—30 to 40 inches; mottled grayish brown (10YR 5/2), dark yellowish brown (10YR 4/4), and yellowish brown (10YR 5/4) silt loam; massive; friable; few coarse and common medium and fine roots; many fine pores; many root channels 0.5 to 3 inches in diameter filled with dark gray clay from the

Bg2 horizon; mildly alkaline; clear wavy boundary.

2C2—40 to 60 inches; grayish brown (10YR 5/2) loam; common medium distinct dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) mottles and few fine prominent strong brown (7.5YR 4/6) mottles; massive; friable; few coarse and common medium and fine roots; many fine pores; few root channels 1 to 3 inches in diameter filled with dark gray clay from upper horizons; thin bedding planes in a few places; mildly alkaline.

The solum ranges from 24 to 36 inches in thickness. Reaction ranges from medium acid to mildly alkaline.

The A horizon has hue of 10YR, value of 4, and chroma of 2; or some pedons have a horizon that is less than 6 inches thick that has hue of 10YR, value of 3, and chroma of 2. The texture is clay or silty clay.

The Bg horizon has hue of 10YR, value of 4 or 5, and chroma of 1. This horizon is mottled in shades of brown and yellow. The texture is clay or silty clay.

The 2C horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. This horizon is mottled in shades of brown and yellow. The texture is loam, fine sandy loam, silt loam, or silty clay loam.

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Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well-aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as—

Very low	0 to 2
Low	2 to 4
Moderate	4 to 6
High	more than 6

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels, i.e., clay coating, clay skin.

Coarse textured soil. Sand or loamy sand.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Compressible (in tables). The volume of soft soil decreases excessively under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic

crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, and clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Fragile (in tables). The soil is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Green-manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or

E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less

than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Sandy loam and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size

of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). In these areas, surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH value are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Rooting depth (in tables). There is a shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). The soil mass is susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory

performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Breaking up a compact subsoil by pulling a special chisel through the soil.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). There is a risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil

normally can be easily increased in density and bearing properties by compaction. This contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Data recorded in the period 1962 to 1980 at Ripley, Tennessee]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	44.8	25.0	35.2	72	2	25	3.62	1.83	5.17	8	3.1
February---	48.6	28.3	38.5	75	7	14	3.64	1.76	5.27	6	2.5
March------	60.0	38.6	49.3	84	16	145	6.07	2.73	8.92	8	1.9
April------	71.7	49.4	60.6	87	32	318	5.57	3.15	7.71	8	.0
May--------	79.3	57.3	68.3	93	39	567	5.05	2.69	7.11	8	.0
June-------	87.4	65.1	76.3	98	51	789	4.00	2.02	5.71	5	.0
July-------	90.6	69.2	79.9	100	56	927	3.47	1.22	5.33	6	.0
August-----	89.0	66.8	77.9	99	55	865	2.77	1.21	4.10	5	.0
September--	82.6	60.8	71.7	95	44	651	4.75	2.20	6.94	6	.0
October----	73.8	47.9	60.9	89	31	350	2.57	1.02	3.91	4	.0
November---	60.4	39.0	49.7	81	18	99	4.81	2.66	6.69	7	.1
December---	50.1	30.0	40.1	72	9	22	4.87	2.03	7.27	7	1.1
Yearly:											
Average--	69.9	48.2	59.0	---	---	---	---	---	---	---	---
Extreme--	---	---	---	101	2	---	---	---	---	---	---
Total----	---	---	---	---	---	4,772	51.19	44.19	58.66	78	8.7

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Data recorded in the period 1962-80 at Ripley, Tennessee]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	March 24	March 31	April 10
2 years in 10 later than--	March 18	March 25	April 6
5 years in 10 later than--	March 5	March 13	March 28
First freezing temperature in fall:			
1 year in 10 earlier than--	November 9	October 28	October 19
2 years in 10 earlier than--	November 16	November 3	October 24
5 years in 10 earlier than--	November 28	November 14	November 2

TABLE 3.--GROWING SEASON

[Data recorded in the period 1962-80 at Ripley, Tennessee]

Probability	Daily minimum temperature during growing season		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	240	222	203
8 years in 10	249	230	208
5 years in 10	267	245	218
2 years in 10	285	260	228
1 year in 10	295	268	233

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
Ad	Adler silt loam, occasionally flooded	35,336	11.7
Am	Amagon silty clay loam, overwash, frequently flooded	1,923	0.6
AO	Amagon overwash and Oaklimeter silt loams, frequently flooded	8,606	2.8
Ar	Arkabutla silt loam, frequently flooded	1,907	0.6
As	Askew silt loam, occasionally flooded	1,173	0.4
Aw	Askew silty clay loam, overwash, occasionally flooded	920	0.3
Bo	Bowdre silty clay, occasionally flooded	7,076	2.3
Br	Bruno loamy fine sand, occasionally flooded	3,831	1.3
Bs	Bruno silty clay loam, overwash, occasionally flooded	912	0.3
Ca	Calloway silt loam	2,320	0.8
Ce	Center silt loam	3,337	1.1
Cm	Commerce silt loam, occasionally flooded	11,191	3.7
Co	Commerce silty clay loam, occasionally flooded	13,039	4.3
Cs	Commerce silt loam, frequently flooded	3,251	1.1
Ct	Convent silt loam, occasionally flooded	6,196	2.0
Cv	Crevasse loamy sand, occasionally flooded	3,199	1.0
De	Dekoven silt loam, overwash, rarely flooded	561	0.2
Du	Dubbs silt loam, occasionally flooded	643	0.2
Dv	Dundee silty clay loam, overwash, occasionally flooded	2,208	0.7
Dw	Dundee silty clay, overwash, occasionally flooded	1,412	0.5
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded	3,572	1.2
GrB3	Grenada silt loam, 2 to 5 percent slopes, severely eroded	1,586	0.5
GrC2	Grenada silt loam, 5 to 8 percent slopes, eroded	376	0.1
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded	892	0.3
Gu	Gullied land-Memphis complex, very steep	546	0.2
Ke	Keyespoint silty clay loam, occasionally flooded	3,106	1.0
Kp	Keyespoint silty clay, occasionally flooded	11,253	3.7
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded	1,928	0.6
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded	1,228	0.4
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded	1,791	0.6
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded	8,286	2.7
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded	4,481	1.5
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded	12,947	4.2
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded	23,580	7.8
MeD3	Memphis silt loam, 8 to 12 percent slopes, severely eroded	8,905	2.9
MeE3	Memphis silt loam, 12 to 20 percent slopes, severely eroded	19,879	6.5
MeF	Memphis silt loam, 20 to 40 percent slopes	30,279	9.9
Mo	Morganfield silt loam, occasionally flooded	5,836	1.9
Op	Openlake silty clay loam, occasionally flooded	1,913	0.6
Os	Openlake silty clay, occasionally flooded	7,968	2.6
Rb	Robinsonville fine sandy loam, occasionally flooded	6,736	2.2
Rc	Robinsonville silt loam, occasionally flooded	7,641	2.5
Rd	Robinsonville silty clay loam, overwash, occasionally flooded	2,085	0.7
Ro	Rosebloom silt loam, frequently flooded	2,886	0.9
Rt	Routon silt loam	2,832	0.9
Ru	Routon silt loam, occasionally flooded	809	0.3
Sh	Sharkey clay, frequently flooded	19,940	6.5
Tu	Tunica clay, frequently flooded	1,914	0.6
UD	Udults, sloping	310	0.1
UO	Udults and Udorthents, very steep	754	0.2
	Total	305,300	100.0

TABLE 5.--PRIME FARMLAND

[Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name]

Map symbol	Soil name
Ad	Adler silt loam, occasionally flooded
As	Askew silt loam, occasionally flooded
Aw	Askew silty clay loam, overwash, occasionally flooded
Bo	Bowdre silty clay, occasionally flooded (where drained)
Ca	Calloway silt loam
Ce	Center silt loam
Cm	Commerce silt loam, occasionally flooded (where drained)
Co	Commerce silty clay loam, occasionally flooded (where drained)
Ct	Convent silt loam, occasionally flooded (where drained)
De	Dekoven silt loam, overwash, rarely flooded (where drained)
Du	Dubbs silt loam, occasionally flooded
Dv	Dundee silty clay loam, overwash, occasionally flooded (where drained)
Dw	Dundee silty clay, overwash, occasionally flooded (where drained)
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded
Ke	Keyespoint silty clay loam, occasionally flooded (where drained)
Kp	Keyespoint silty clay, occasionally flooded (where drained)
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded
Mo	Morganfield silt loam, occasionally flooded
Op	Openlake silty clay loam, occasionally flooded (where drained)
Os	Openlake silty clay, occasionally flooded (where drained)
Rb	Robinsonville fine sandy loam, occasionally flooded
Rc	Robinsonville silt loam, occasionally flooded
Rd	Robinsonville silty clay loam, overwash, occasionally flooded
Rt	Routon silt loam (where drained)
Ru	Routon silt loam, occasionally flooded (where drained)

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Cotton lint	Corn	Grain sorghum	Soybeans	Wheat	Alfalfa hay	Tall fescue
		Lbs	Bu	Bu	Bu	Bu	Tons	AUM*
Ad------------- Adler	IIw	850	120	100	45	50	4.0	9.5
Am------------- Amagon	Vw	---	---	70	25	---	---	7.0
AO------------- Amagon and Oaklimeter	Vw	---	---	---	---	---	---	7.0
Ar------------- Arkabutla	IVw	---	---	75	25	---	---	7.0
As, Aw---------- Askew	IIw	700	90	75	35	45	---	8.0
Bo------------- Bowdre	IIIw	---	85	75	35	---	---	7.5
Br------------- Bruno	IVs	---	---	---	---	30	3.0	5.5
Bs------------- Bruno	IVs	400	---	---	---	35	3.0	6.0
Ca------------- Calloway	IIw	650	85	70	30	35	---	8.0
Ce------------- Center	IIw	700	90	80	35	40	---	8.0
Cm, Co---------- Commerce	IIIw	700	95	85	40	45	---	8.5
Cs------------- Commerce	Vw	---	---	---	---	---	---	---
Ct------------- Convent	IIIw	650	90	80	35	40	---	9.0
Cv------------- Crevasse	VIs	---	---	---	---	---	---	4.5
De------------- Dekoven	IIIw	700	120	105	45	35	---	9.0
Du------------- Dubbs	IIw	700	95	85	35	40	3.8	9.0
Dv, Dw---------- Dundee	IIIw	---	80	70	30	---	---	7.5
GrB2------------ Grenada	IIe	625	80	70	30	40	---	7.5
GrB3------------ Grenada	IIIe	525	65	55	20	35	---	7.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Cotton lint	Corn	Grain sorghum	Soybeans	Wheat	Alfalfa hay	Tall fescue
		Lbs	Bu	Bu	Bu	Bu	Tons	AUM*
GrC2------------ Grenada	IIIe	550	70	60	25	35	---	7.0
GrC3------------ Grenada	IVe	500	---	---	20	30	---	6.0
Gu-------------- Gullied land-Memphis	VIIe	---	---	---	---	---	---	---
Ke, Kp---------- Keyespoint	IIIw	650	85	75	35	---	---	7.5
LoB2------------ Loring	IIe	725	90	75	35	45	3.8	7.5
LoB3------------ Loring	IIIe	625	75	65	25	40	---	6.5
LoC2------------ Loring	IIIe	650	80	70	30	40	3.8	7.0
LoC3------------ Loring	IVe	550	65	55	20	35	---	6.0
LoD3------------ Loring	VIe	---	---	---	---	---	---	5.5
MeB2------------ Memphis	IIe	800	100	85	40	45	4.5	8.5
MeC2------------ Memphis	IIIe	700	85	75	35	40	4.3	7.5
MeD3------------ Memphis	VIe	---	---	---	---	35	3.8	7.0
MeE3------------ Memphis	VIe	---	---	---	---	---	---	6.0
MeF------------- Memphis	VIIe	---	---	---	---	---	---	5.5
Mo-------------- Morganfield	IIw	900	120	100	45	50	4.5	9.5
Op, Os---------- Openlake	IIIw	625	80	70	35	---	---	7.0
Rb, Rc---------- Robinsonville	IIw	825	115	100	45	50	4.2	9.5
Rd-------------- Robinsonville	IIw	800	110	95	45	45	4.2	9.5
Ro-------------- Rosebloom	Vw	---	---	---	---	---	---	6.0
Rt, Ru---------- Routon	IIIw	500	70	65	35	35	---	7.0

See footnote at end of table.

TABLE 6.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Cotton lint	Corn	Grain sorghum	Soybeans	Wheat	Alfalfa hay	Tall fescue
		Lbs	Bu	Bu	Bu	Bu	Tons	AUM*
Sh-------------- Sharkey	Vw	---	---	60	20	---	---	5.5
Tu-------------- Tunica	Vw	---	---	65	25	---	---	6.0
UD-------------- Udults	IVe	---	70	60	25	35	3.8	6.5
UO-------------- Udults and Udorthents	VIIe	---	---	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 7.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)		
		Erosion (e)	Wetness (w)	Soil problem (s)
		Acres	Acres	Acres
I	---	---	---	---
II	84,474	18,447	66,027	---
III	98,125	28,561	69,564	---
IV	16,138	9,488	1,907	4,743
V	38,520	---	38,520	---
VI	36,464	33,265	---	3,199
VII	31,579	31,579	---	---
VIII	---	---	---	---

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Management concerns: Plant competition	Potential productivity: Common trees	Potential productivity: Site index	Potential productivity: Productivity class*	Trees to plant
Ad-------------- Adler	Slight	Moderate	Moderate	Moderate	Yellow poplar-------	115	129	Yellow poplar, eastern cottonwood, sweetgum, American sycamore.
					Eastern cottonwood--	120	186	
					Green ash-----------	95	---	
					Cherrybark oak------	90	114	
					Willow oak----------	100	100	
					Sweetgum------------	100	143	
					American sycamore---	115	186	
Am-------------- Amagon	Slight	Severe	Moderate	Severe	Eastern cottonwood--	100	129	Eastern cottonwood, cherrybark oak, sweetgum, American sycamore.
					Willow oak----------	100	100	
					Cherrybark oak------	90	114	
					Green ash-----------	80	---	
					Sweetgum------------	100	143	
					Baldcypress---------	---	---	
AO:								
Amagon----------	Slight	Severe	Moderate	Severe	Eastern cottonwood--	100	129	Eastern cottonwood, cherrybark oak, willow oak, sweetgum, American sycamore.
					Willow oak----------	100	100	
					Cherrybark oak------	90	114	
					Green ash-----------	80	---	
					Sweetgum------------	100	143	
Oaklimeter------	Slight	Moderate	Severe	Moderate	Cherrybark oak------	100	143	Cherrybark oak, eastern cottonwood, sweetgum, yellow poplar.
					Eastern cottonwood--	100	129	
					Green ash-----------	90	---	
					Willow oak----------	100	100	
					Sweetgum------------	100	143	
					Shagbark hickory----	---	---	
Ar-------------- Arkabutla	Slight	Severe	Moderate	Moderate	Cherrybark oak------	105	172	Cherrybark oak, eastern cottonwood, green ash, sweetgum, American sycamore.
					Eastern cottonwood--	110	157	
					Green ash-----------	95	---	
					Sweetgum------------	100	143	
					Willow oak----------	100	143	
					Baldcypress---------	---	---	
As, Aw---------- Askew	Slight	Slight	Slight	Moderate	Eastern cottonwood--	100	129	Eastern cottonwood, cherrybark oak, American sycamore.
					Cherrybark oak------	90	114	
					Willow oak----------	90	86	
					Sweetgum------------	90	100	
					Shagbark hickory----	---	---	
Bo-------------- Bowdre	Slight	Moderate	Moderate	Moderate	Cherrybark oak------	90	114	Eastern cottonwood, sweetgum, American sycamore.
					Eastern cottonwood--	110	157	
					Sweetgum------------	95	114	
					American elm--------	95	86	
					Sugarberry----------	---	---	
Br-------------- Bruno	Slight	Moderate	Moderate	Moderate	Cherrybark oak------	94	129	Cherrybark oak, Shumard oak, willow oak, sweetgum, yellow poplar.
					Sweetgum------------	94	114	
					Willow oak----------	---	---	
					Yellow poplar-------	94	100	
					American sycamore---	---	---	
					Eastern cottonwood--	---	---	
					Black willow--------	---	---	
					Sugarberry----------	---	---	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity class*	
Bs: Bruno	Slight	Slight	Moderate	Moderate	Sweetgum	96	129	Cherrybark oak, Shumard oak, willow oak, sweetgum, yellow poplar.
					Eastern cottonwood	96	114	
					Willow oak	---	---	
					Yellow poplar	96	100	
					American elm	---	---	
					Black willow	---	---	
					Sugarberry	---	---	
Ca: Calloway	Slight	Moderate	Slight	Moderate	Southern red oak	70	57	Sweetgum, loblolly pine.
					Cherrybark oak	80	114	
					Sweetgum	80	86	
Ce: Center	Slight	Moderate	Slight	Moderate	Southern red oak	75	57	Eastern cottonwood, sweetgum, American sycamore, southern red oak, cherrybark oak.
					Eastern cottonwood	95	114	
					Sweetgum	90	100	
					Yellow poplar	90	86	
					American sycamore	90	100	
					American elm	---	---	
Cm, Co: Commerce	Slight	Moderate	Slight	Moderate	Green ash	80	---	Eastern cottonwood, American sycamore.
					Eastern cottonwood	120	186	
					American sycamore	---	---	
					Willow oak	---	---	
					American elm	---	---	
Cs: Commerce	Slight	Moderate	Moderate	Moderate	Eastern cottonwood	113	172	Eastern cottonwood, American sycamore.
					Overcup oak	---	---	
					Sugarberry	---	---	
					Black willow	---	---	
Ct: Convent	Slight	Moderate	Slight	Moderate	Green ash	80	---	Eastern cottonwood, American sycamore.
					Eastern cottonwood	120	186	
					Sweetgum	110	172	
					American sycamore	---	---	
					Willow oak	100	100	
Cv: Crevasse	Slight	Moderate	Moderate	Slight	Sweetgum	90	100	Eastern cottonwood, American sycamore.
					Black willow	---	---	
					Eastern cottonwood	100	129	
					American sycamore	90	100	
De: Dekoven	Slight	Moderate	Moderate	Severe	Sweetgum	95	114	Sweetgum, American sycamore.
					Eastern cottonwood	100	129	
					Overcup oak	---	---	
					Swamp white oak	---	---	
					Silver maple	---	---	
					American sycamore	---	---	
Du: Dubbs	Slight	Slight	Slight	Moderate	Cherrybark oak	100	143	Eastern cottonwood, green ash, sweetgum, American sycamore.
					Eastern cottonwood	100	129	
					Sweetgum	95	114	
					Willow oak	95	86	
					Shagbark hickory	---	---	
Dv: Dundee	Slight	Moderate	Moderate	Severe	Cherrybark oak	105	172	Cherrybark oak, eastern cottonwood, sweetgum.
					Eastern cottonwood	100	129	
					Sweetgum	100	143	
					Willow oak	100	100	

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity class*	
Dw-------------- Dundee	Slight	Moderate	Severe	Moderate	Cherrybark oak------ Eastern cottonwood-- Sweetgum------------ Willow oak----------	105 100 100 100	172 129 143 100	Cherrybark oak, eastern cottonwood, sweetgum.
GrB2, GrB3------ Grenada	Slight	Slight	Slight	Moderate	Southern red oak---- Cherrybark oak------ Sweetgum------------ Mockernut hickory---	80 85 80 ---	57 100 86 ---	Shumard oak, cherrybark oak, loblolly pine, white oak, shortleaf pine, sweetgum.
GrC2, GrC3------ Grenada	Moderate	Slight	Slight	Moderate	Southern red oak---- Cherrybark oak------ Sweetgum------------ Mockernut hickory---	80 85 80 ---	57 100 86 ---	Shumard oak, cherrybark oak, loblolly pine, white oak, shortleaf pine, sweetgum.
Gu: Gullied land.								
Memphis---------	Severe	Severe	Moderate	Moderate	Loblolly pine------- Cherrybark oak------ Southern red oak---- Mockernut hickory---	90 90 80 ---	129 114 57 ---	Cherrybark oak, loblolly pine, yellow poplar.
Ke, Kp---------- Keyespoint	Slight	Moderate	Moderate	Moderate	Eastern cottonwood-- Cherrybark oak------ Sweetgum------------ American sycamore--- Sugarberry---------- Pecan--------------- American elm--------	110 100 95 100 --- --- ---	157 143 114 129 --- --- ---	Eastern cottonwood, American sycamore, sweetgum, cherrybark oak.
LoB2, LoB3------ Loring	Slight	Slight	Slight	Moderate	Southern red oak---- Cherrybark oak------ Sweetgum------------ Mockernut hickory---	74 86 90 ---	57 100 100 ---	Yellow poplar, cherrybark oak, southern red oak, loblolly pine, shortleaf pine.
LoC2, LoC3, LoD3----------- Loring	Moderate	Slight	Slight	Moderate	Southern red oak---- Cherrybark oak------ Sweetgum------------ Mockernut hickory---	74 86 90 ---	57 100 100 ---	Yellow poplar, cherrybark oak, southern red oak, loblolly pine, shortleaf pine.
MeB2------------ Memphis	Slight	Slight	Slight	Moderate	Yellow poplar------- Cherrybark oak------ Sweetgum------------ Mockernut hickory---	95 90 90 ---	100 114 100 ---	Cherrybark oak, loblolly pine, yellow poplar, southern red oak.
MeC2, MeD3------ Memphis	Moderate	Slight	Slight	Moderate	Yellow poplar------- Cherrybark oak------ Sweetgum------------ Mockernut hickory---	95 90 90 ---	100 114 100 ---	Cherrybark oak, loblolly pine, yellow poplar, southern red oak.
MeE3, MeF------- Memphis	Severe	Moderate	Slight	Moderate	Yellow poplar------- Loblolly pine------- Cherrybark oak------ Sweetgum------------ Mockernut hickory---	95 90 90 90 ---	100 129 114 100 ---	Cherrybark oak, loblolly pine, yellow poplar, southern red oak.

See footnote at end of table.

TABLE 8.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Management concerns				Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Plant competition	Common trees	Site index	Productivity class*	
Mo------------- Morganfield	Slight	Slight	Slight	Moderate	Eastern cottonwood--	120	186	Eastern cottonwood, sweetgum, American sycamore, yellow poplar.
					Green ash-----------	90	---	
					Sweetgum------------	110	172	
					Yellow poplar-------	115	129	
					Cherrybark oak------	90	114	
Op, Os---------- Openlake	Slight	Moderate	Moderate	Moderate	Eastern cottonwood--	110	157	Eastern cottonwood, American sycamore, sweetgum, cherrybark oak.
					Cherrybark oak------	100	143	
					Sweetgum------------	95	114	
					Green ash-----------	90	---	
					American sycamore---	100	129	
					Sugarberry----------	---	---	
					Pecan---------------	---	---	
Rb, Rc, Rd------ Robinsonville	Slight	Slight	Slight	Moderate	Eastern cottonwood--	110	157	Eastern cottonwood, sweetgum, American sycamore.
					Sweetgum------------	105	157	
					American sycamore---	115	186	
					American elm--------	---	---	
Ro------------- Rosebloom	Slight	Severe	Moderate	Severe	Cherrybark oak------	95	129	Cherrybark oak, green ash, eastern cottonwood, willow oak, sweetgum.
					Green ash-----------	95	---	
					Eastern cottonwood--	100	129	
					Water oak-----------	95	86	
					Willow oak----------	90	86	
					Sweetgum------------	95	114	
					American sycamore---	80	86	
					Baldcypress---------	---	---	
Rt, Ru---------- Routon	Slight	Moderate	Moderate	Moderate	Southern red oak----	80	57	Cherrybark oak, eastern cottonwood, American sycamore, white ash, sweetgum.
					Cherrybark oak------	110	186	
					Water oak-----------	90	86	
					White oak-----------	80	57	
					Willow oak----------	90	86	
					Sweetgum------------	105	157	
					White ash-----------	90	57	
Sh------------- Sharkey	Slight	Severe	Severe	Severe	Eastern cottonwood--	105	143	Baldcypress.
					Overcup oak---------	---	---	
					Baldcypress---------	---	---	
					Black willow--------	---	---	
Tu------------- Tunica	Slight	Severe	Severe	Severe	Eastern cottonwood--	105	143	Eastern cottonwood, baldcypress.
					Nuttall oak---------	---	---	
					Overcup oak---------	---	---	
					Baldcypress---------	---	---	

* Productivity class is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

TABLE 9.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
Ad: Adler	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Slight	Moderate: flooding.
Am: Amagon	Severe: flooding, wetness.	Moderate: flooding, wetness, percs slowly.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
AO:					
Amagon	Severe: flooding, wetness.	Moderate: flooding, wetness, percs slowly.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
Oaklimeter	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.	Moderate: flooding, wetness.	Severe: flooding.
Ar: Arkabutla	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.	Moderate: flooding, wetness.	Severe: flooding, wetness.
As, Aw: Askew	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
Bo: Bowdre	Severe: flooding, too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
Br, Bs: Bruno	Severe: flooding.	Slight	Moderate: slope, flooding.	Slight	Moderate: droughty, flooding.
Ca: Calloway	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Ce: Center	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
Cm, Co: Commerce	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
Cs: Commerce	Severe: flooding.	Moderate: flooding, wetness, percs slowly.	Severe: flooding.	Moderate: wetness.	Severe: flooding.
Ct: Convent	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
Cv: Crevasse	Severe: flooding.	Moderate: too sandy.	Moderate: too sandy, flooding.	Moderate: too sandy.	Moderate: droughty.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
De-------------------- Dekoven	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Du-------------------- Dubbs	Severe: flooding.	Slight----------	Moderate: slope, flooding.	Slight----------	Moderate: flooding.
Dv-------------------- Dundee	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: wetness, flooding.
Dw-------------------- Dundee	Severe: flooding, too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.	Severe: too clayey.
GrB2, GrB3------------ Grenada	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.
GrC2, GrC3------------ Grenada	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Moderate: wetness.	Moderate: wetness.
Gu: Gullied land.					
Memphis.					
Ke-------------------- Keyespoint	Severe: flooding, percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight----------	Moderate: flooding.
Kp-------------------- Keyespoint	Severe: flooding, percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey.
LoB2, LoB3------------ Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Slight----------	Slight.
LoC2, LoC3------------ Loring	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight----------	Slight.
LoD3------------------ Loring	Moderate: slope, wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
MeB2------------------ Memphis	Slight----------	Slight----------	Moderate: slope.	Slight----------	Slight.
MeC2------------------ Memphis	Slight----------	Slight----------	Severe: slope.	Slight----------	Slight.

TABLE 9.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
MeD3: Memphis	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
MeE3: Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
MeF: Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Mo: Morganfield	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Op: Openlake	Severe: flooding, percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Moderate: wetness.	Moderate: wetness, flooding.
Os: Openlake	Severe: flooding, percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey.
Rb, Rc, Rd: Robinsonville	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
Ro: Rosebloom	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
Rt: Routon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Ru: Routon	Severe: flooding,	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Sh: Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, percs slowly.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.
Tu: Tunica	Severe: flooding, percs slowly, too clayey.	Severe: too clayey, percs slowly.	Severe: too clayey, flooding, percs slowly.	Severe: too clayey.	Severe: flooding, too clayey.
UD. Udults					
UO: Udults.					
Udorthents.					

TABLE 10.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Ad----------------- Adler	Good	Good	Good	Good	Fair	Poor	Poor	Good	Good	Poor.
Am----------------- Amagon	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
AO:										
Amagon------------	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Oaklimeter--------	Poor	Fair	Good	Good	Poor	Poor	Poor	Fair	Good	Poor.
Ar----------------- Arkabutla	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
As, Aw------------- Askew	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Bo----------------- Bowdre	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Poor.
Br----------------- Bruno	Poor	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Bs----------------- Bruno	Poor	Fair	Fair	Poor	Poor	Very poor.	Very poor.	Fair	Poor	Very poor.
Ca----------------- Calloway	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Ce----------------- Center	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Cm, Co------------- Commerce	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Cs----------------- Commerce	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Ct----------------- Convent	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Cv----------------- Crevasse	Poor	Fair	Fair	Poor	Poor	Poor	Very poor.	Fair	Poor	Very poor.
De----------------- Dekoven	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Du----------------- Dubbs	Good	Good	Good	Good	Good	Fair	Poor	Good	Good	Poor.
Dv, Dw------------- Dundee	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
GrB2, GrB3--------- Grenada	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.

TABLE 10.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
GrC2, GrC3 Grenada	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Gu: Gullied land.										
Memphis	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ke, Kp Keyespoint	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
LoB2, LoB3 Loring	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
LoC2, LoC3, LoD3 Loring	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MeB2 Memphis	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
MeC2, MeD3 Memphis	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
MeE3 Memphis	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MeF Memphis	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Mo Morganfield	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Op, Os Openlake	Fair	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Rb, Rc, Rd Robinsonville	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ro Rosebloom	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Rt, Ru Routon	Poor	Fair	Fair	Fair	Fair	Good	Fair	Fair	Fair	Fair.
Sh Sharkey	Poor	Poor	Fair	Fair	Fair	Fair	Fair	Poor	Fair	Fair.
Tu Tunica	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
UD. Udults										
UO: Udults.										
Udorthents.										

TABLE 11.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Ad: Adler	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Am: Amagon	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: flooding.
AO:						
Amagon	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: flooding.
Oaklimeter	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Ar: Arkabutla	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding, wetness.
As, Aw: Askew	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Moderate: wetness, flooding.
Bo: Bowdre	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Severe: too clayey.
Br, Bs: Bruno	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
Ca: Calloway	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
Ce: Center	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
Cm, Co: Commerce	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Moderate: wetness, flooding.
Cs: Commerce	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
Ct: Convent	Severe: wetness, cutbanks cave.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: wetness, flooding.
Cv: Crevasse	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: droughty.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
De------------- Dekoven	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness.	Severe: wetness.
Du------------- Dubbs	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Dv------------- Dundee	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Moderate: wetness, flooding.
Dw------------- Dundee	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, flooding.	Severe: too clayey.
GrB2, GrB3------ Grenada	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.	Moderate: wetness.
GrC2, GrC3------ Grenada	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Moderate: wetness.
Gu: Gullied land.						
Memphis--------	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: low strength.	Slight.
Ke------------- Keyespoint	Severe: wetness.	Severe: flooding, shrink-swell.	Severe: flooding, wetness.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength, flooding.	Moderate: flooding.
Kp------------- Keyespoint	Severe: wetness.	Severe: flooding, shrink-swell.	Severe: flooding, wetness.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength, flooding.	Severe: too clayey.
LoB2, LoB3------ Loring	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.	Slight.
LoC2, LoC3------ Loring	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Slight.
LoD3------------ Loring	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Severe: low strength.	Moderate: slope.
MeB2------------ Memphis	Slight---------	Slight---------	Slight---------	Slight---------	Severe: low strength.	Slight.
MeC2------------ Memphis	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: low strength.	Slight.
MeD3------------ Memphis	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.

TABLE 11.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
MeE3, MeF------- Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Mo-------------- Morganfield	Moderate: cutbanks cave, wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Op-------------- Openlake	Severe: wetness.	Severe: flooding, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength, flooding.	Moderate: wetness, flooding.
Os-------------- Openlake	Severe: wetness.	Severe: flooding, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength, flooding.	Severe: too clayey.
Rb, Rc, Rd------ Robinsonville	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Ro-------------- Rosebloom	Severe: wetness, cutbanks cave.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
Rt-------------- Routon	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength, wetness.	Severe: wetness.
Ru-------------- Routon	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
Sh-------------- Sharkey	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: wetness, flooding, too clayey.
Tu-------------- Tunica	Severe: wetness.	Severe: flooding, shrink-swell.	Severe: flooding, wetness.	Severe: flooding, shrink-swell.	Severe: low strength, flooding, shrink-swell.	Severe: flooding, too clayey.
UD. Udults						
UO: Udults.						
Udorthents.						

TABLE 12.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Ad: Adler	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Am: Amagon	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
AO:					
Amagon	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Oaklimeter	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
Ar: Arkabutla	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
As, Aw: Askew	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness.
Bo: Bowdre	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding.	Fair: wetness.
Br, Bs: Bruno	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: seepage, too sandy.
Ca: Calloway	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ce: Center	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Cm, Co, Cs: Commerce	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Ct: Convent	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Cv: Crevasse	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: seepage, too sandy.
De: Dekoven	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Du: Dubbs	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Good.
Dv, Dw: Dundee	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
GrB2, GrB3, GrC2, GrC3: Grenada	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness.	Moderate: wetness.	Fair: too clayey, wetness.
Gu: Gullied land.					
Memphis	Moderate: percs slowly.	Severe: slope.	Slight	Slight	Good.
Ke, Kp: Keyespoint	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: wetness, too clayey.
LoB2, LoB3, LoC2, LoC3: Loring	Severe: wetness, percs slowly.	Moderate: slope.	Moderate: wetness.	Moderate: wetness.	Fair: wetness.
LoD3: Loring	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope.	Moderate: wetness, slope.	Fair: slope, wetness.
MeB2, MeC2: Memphis	Moderate: percs slowly.	Moderate: seepage, slope.	Slight	Slight	Good.
MeD3: Memphis	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
MeE3, MeF: Memphis	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Mo: Morganfield	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: wetness.
Op, Os: Openlake	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack.

TABLE 12.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Rb, Rc, Rd---------- Robinsonville	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Good.
Ro------------------ Rosebloom	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Rt------------------ Routon	Severe: wetness, percs slowly.	Moderate: seepage.	Severe: wetness.	Severe: wetness.	Poor: wetness.
Ru------------------ Routon	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
Sh------------------ Sharkey	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
Tu------------------ Tunica	Severe: flooding, wetness, percs slowly.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
UD. Udults					
UO: Udults.					
Udorthents.					

TABLE 13.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Ad: Adler	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Am: Amagon	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
AO:				
Amagon	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Oaklimeter	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Ar: Arkabutla	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
As, Aw: Askew	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Bo: Bowdre	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Br, Bs: Bruno	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Ca: Calloway	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Ce: Center	Fair: wetness, low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Cm: Commerce	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
Co: Commerce	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
Cs: Commerce	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
Ct: Convent	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
Cv: Crevasse	Good	Probable	Improbable: too sandy.	Poor: too sandy.
De: Dekoven	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Du----- Dubbs	Good-----	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Dv, Dw----- Dundee	Fair: wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
GrB2, GrB3, GrC2, GrC3----- Grenada	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Gu: Gullied land.				
Memphis-----	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
Ke, Kp----- Keyespoint	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
LoB2, LoB3, LoC2, LoC3----- Loring	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
LoD3----- Loring	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
MeB2, MeC2----- Memphis	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
MeD3----- Memphis	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
MeE3----- Memphis	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
MeF----- Memphis	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Mo----- Morganfield	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
Op, Os----- Openlake	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Rb, Rc, Rd----- Robinsonville	Good-----	Improbable: excess fines.	Improbable: excess fines.	Good.
Ro----- Rosebloom	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Rt, Ru----- Routon	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Sh----- Sharkey	Poor: low strength, wetness, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.

TABLE 13.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
Tu-------------------- Tunica	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
UD. Udults				
UO: Udults.				
Udorthents.				

TABLE 14.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions	Features affecting-- Grassed waterways
Ad: Adler	Moderate: seepage.	Severe: piping.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
Am: Amagon	Slight	Severe: wetness.	Percs slowly, flooding.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
AO:						
Amagon	Slight	Moderate: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly, flooding.	Erodes easily	Wetness, percs slowly.
Oaklimeter	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
Ar: Arkabutla	Moderate: seepage.	Severe: wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
As, Aw: Askew	Severe: seepage.	Severe: piping, wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
Bo: Bowdre	Moderate: seepage.	Severe: piping.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.
Br: Bruno	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Too sandy	Droughty.
Bs: Bruno	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, flooding.	Too sandy	Droughty.
Ca: Calloway	Moderate: seepage.	Severe: thin layer.	Percs slowly	Wetness, percs slowly.	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
Ce: Center	Slight	Severe: piping, wetness.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Wetness, erodes easily.
Cm, Co, Cs: Commerce	Moderate: seepage.	Severe: thin layer, wetness.	Flooding	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
Ct: Convent	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
Cv: Crevasse	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Too sandy	Droughty.
De: Dekoven	Moderate: seepage.	Severe: piping, wetness.	Favorable	Wetness	Erodes easily, wetness.	Wetness, erodes easily.
Du: Dubbs	Severe: seepage.	Severe: piping.	Deep to water, flooding.	Erodes easily, flooding.	Erodes easily	Erodes easily.
Dv: Dundee	Moderate: seepage.	Severe: thin layer, wetness.	Flooding	Wetness	Erodes easily, wetness.	Erodes easily.
Dw: Dundee	Moderate: seepage.	Severe: thin layer, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness	Percs slowly.
GrB2, GrB3, GrC2, GrC3: Grenada	Slight	Severe: piping.	Percs slowly, slope.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness.	Erodes easily, rooting depth.
Gu: Gullied land.						
Memphis	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
Ke: Keyespoint	Moderate: seepage.	Severe: piping.	Percs slowly, flooding.	Wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.
Kp: Keyespoint	Moderate: seepage.	Severe: piping.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness	Percs slowly.
LoB2, LoB3, LoC2, LoC3: Loring	Slight	Moderate: piping.	Slope, percs slowly.	Percs slowly, rooting depth, slope.	Erodes easily, wetness, rooting depth.	Erodes easily, rooting depth.
LoD3: Loring	Slight	Moderate: piping.	Slope, percs slowly.	Percs slowly, rooting depth, slope.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
MeB2, MeC2: Memphis	Moderate: seepage.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
MeD3, MeE3, MeF: Memphis	Moderate: seepage.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Mo: Morganfield	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
Op: Openlake	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, percs slowly.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.

TABLE 14.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Os: Openlake	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Percs slowly.
Rb, Rc: Robinsonville	Severe: seepage.	Severe: piping.	Deep to water	Flooding	Favorable	Favorable.
Rd: Robinsonville	Severe: seepage.	Severe: piping.	Deep to water	Soil blowing, flooding.	Soil blowing	Favorable.
Ro: Rosebloom	Moderate: seepage.	Severe: wetness.	Flooding	Wetness, flooding.	Wetness	Wetness, erodes easily.
Rt: Routon	Slight	Severe: piping, wetness.	Percs slowly	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Ru: Routon	Slight	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly, erodes easily.	Erodes easily, wetness, percs slowly.	Wetness, erodes easily, percs slowly.
Sh: Sharkey	Slight	Severe: hard to pack, wetness.	Percs slowly, flooding.	Wetness, slow intake, percs slowly.	Wetness, percs slowly.	Wetness, rooting depth.
Tu: Tunica	Moderate: seepage.	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, slow intake.	Wetness, percs slowly.	Percs slowly.
UD. Udults						
UO: Udults.						
Udorthents.						

TABLE 15.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In								Pct	
Ad-------------- Adler	0-6	Silt loam--------	ML, CL-ML	A-4	100	100	100	95-100	<28	NP-7
	6-60	Silt loam, silt, very fine sandy loam.	ML, CL, CL-ML	A-4	100	100	95-100	60-95	<30	NP-10
Am-------------- Amagon	0-10	Silty clay loam.	CL, CH	A-7	100	100	90-100	90-100	41-55	20-30
	10-16	Silt loam--------	CL, ML, CL-ML	A-4, A-6	100	100	85-100	85-100	25-40	5-15
	16-46	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	85-100	85-100	30-45	11-22
	46-62	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	100	95-100	80-100	60-95	20-45	1-22
AO:										
Amagon----------	0-25	Silt loam--------	ML, CL, CL-ML	A-4	100	100	85-100	85-100	<30	NP-10
	25-56	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	85-100	85-100	30-45	11-22
	56-72	Silt loam, loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	100	100	80-100	60-100	20-45	1-22
Oaklimeter------	0-8	Silt loam--------	ML, CL, CL-ML	A-4	100	100	90-100	70-90	<30	NP-8
	8-72	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4	100	100	90-100	90-100	<30	NP-10
Ar-------------- Arkabutla	0-5	Silt loam--------	CL, CL-ML	A-4, A-6	100	100	85-100	60-95	25-35	7-15
	5-65	Silty clay loam, loam, silt loam.	CL	A-6, A-7	100	100	85-100	70-90	30-45	12-25
As-------------- Askew	0-9	Silt loam--------	ML, CL-ML, CL	A-4, A-6	100	100	90-100	75-95	20-35	3-11
	9-38	Silty clay loam, silt loam, loam.	CL, ML, CL-ML	A-4, A-6	100	100	90-100	70-90	25-40	6-20
	38-60	Sandy loam, fine sandy loam, silt loam.	SM, SC, CL, ML	A-2, A-4, A-6	100	100	65-100	25-90	20-40	1-20
Aw-------------- Askew	0-10	Silty clay loam	CL	A-6, A-7	100	100	95-100	85-95	30-45	12-25
	10-48	Silty clay loam, silt loam, loam.	CL, ML, CL-ML	A-4, A-6	100	100	90-100	70-90	25-40	6-20
	48-62	Sandy loam, fine sandy loam, silt loam.	SM, SC, CL, ML	A-2, A-4, A-6	100	100	65-100	25-90	20-40	1-20
Bo-------------- Bowdre	0-18	Silty clay-------	CH	A-7	100	100	95-100	90-95	51-65	28-40
	18-40	Silt loam, loam	CL-ML, CL, ML	A-4, A-6	100	100	90-100	70-90	25-35	3-12
	40-60	Sandy loam, silt loam, loam.	SC, CL, CL-ML, SM-SC	A-2, A-4	100	100	60-100	30-90	20-30	3-10
Br-------------- Bruno	0-6	Loamy fine sand	SM	A-2	100	100	50-75	15-30	---	NP
	6-48	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2	100	100	60-80	10-30	---	NP
	48-73	Sand-------------	SP-SM, SM	A-2, A-3	100	100	50-70	5-20	---	NP

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Bs--------------- Bruno	0-9	Silty clay loam	CL	A-6, A-7	100	100	90-100	80-95	30-42	11-20
	9-60	Loamy sand, loamy fine sand, sand.	SP-SM, SM	A-2	100	100	60-80	10-30	---	NP
Ca--------------- Calloway	0-27	Silt loam--------	CL-ML, CL	A-4, A-6	100	100	100	90-100	25-35	5-15
	27-53	Silt loam, silty clay loam.	CL	A-6	100	100	100	90-95	30-40	12-20
	53-62	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	100	100	100	90-100	25-35	5-15
Ce--------------- Center	0-15	Silt loam--------	ML, CL, CL-ML	A-4, A-6	100	95-100	90-100	80-100	<30	3-11
	15-50	Silty clay loam, silt loam.	CL	A-6, A-4	100	95-100	95-100	90-100	25-40	8-16
	50-62	Silt loam--------	ML, CL, CL-ML	A-4, A-6	100	95-100	90-100	80-100	<30	3-11
Cm--------------- Commerce	0-11	Silt loam--------	CL-ML, CL, ML	A-4	100	100	100	75-100	<30	NP-10
	11-62	Silty clay loam, silt loam, loam.	CL	A-6, A-7	100	100	100	85-100	32-45	11-23
Co--------------- Commerce	0-7	Silty clay loam	CL	A-6, A-7	100	100	100	90-100	32-50	11-25
	7-62	Silty clay loam, silt loam, loam.	CL	A-6, A-7	100	100	100	85-100	32-45	11-23
Cs--------------- Commerce	0-11	Silt loam--------	CL-ML, CL, ML	A-4	100	100	100	75-100	<30	NP-10
	11-62	Silty clay loam, silt loam, loam.	CL	A-6, A-7	100	100	100	85-100	32-45	11-23
Ct--------------- Convent	0-7	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	85-100	<27	NP-7
	7-62	Silt loam, very fine sandy loam, loam.	ML, CL-ML	A-4	100	100	95-100	75-100	<27	NP-7
Cv--------------- Crevasse	0-7	Loamy sand-------	SM	A-2	100	95-100	60-100	15-30	---	NP
	7-65	Sand, loamy sand, loamy fine sand.	SP-SM, SM	A-2, A-3	100	95-100	50-100	5-20	---	NP
De--------------- Dekoven	0-30	Silt loam--------	ML, CL, CL-ML	A-4, A-6	100	95-100	90-100	85-100	25-40	5-20
	30-72	Silty clay loam, silt loam.	ML, CL, CL-ML	A-4, A-6, A-7	100	95-100	90-100	85-100	25-45	5-20
Du--------------- Dubbs	0-5	Silt loam--------	ML, CL-ML, CL	A-4	100	100	100	60-90	20-35	3-10
	5-42	Silty clay loam, clay loam, sandy clay loam.	CL	A-6, A-7	100	100	100	85-100	35-50	15-25
	42-64	Loam, silt loam, very fine sandy loam.	ML, CL-ML, CL	A-4, A-6	100	100	85-95	55-90	20-35	3-14
Dv--------------- Dundee	0-13	Silty clay loam	CL, CH	A-6, A-7	100	100	95-100	90-100	30-52	12-27
	13-21	Silt loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	100	100	90-100	75-98	20-35	3-11
	21-60	Silt loam, silty clay loam, clay loam.	CL	A-4, A-6, A-7	100	100	90-100	70-95	28-44	9-22

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In								Pct	
Dw--------------- Dundee	0-17	Silty clay-------	CH, CL	A-7	100	100	90-100	85-100	47-70	24-40
	17-22	Silt loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	100	100	90-100	75-98	20-35	3-11
	22-57	Silt loam, silty clay loam, clay loam.	CL	A-4, A-6, A-7	100	100	90-100	70-95	28-44	9-22
	57-62	Loam, very fine sandy loam, silt loam.	CL, CL-ML, ML	A-4	100	100	85-100	60-90	<30	NP-8
GrB2, GrC2------- Grenada	0-6	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	90-100	<30	NP-6
	6-20	Silt loam, silty clay loam.	CL	A-6, A-4	100	100	95-100	90-100	27-40	8-19
	20-25	Silt loam--------	CL-ML, CL	A-4	100	100	95-100	90-100	20-30	5-10
	25-47	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	100	100	95-100	90-100	25-45	5-24
	47-60	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	100	100	95-100	90-100	25-45	5-24
GrB3, GrC3------- Grenada	0-5	Silt loam--------	ML, CL-ML	A-4	100	100	95-100	90-100	<30	NP-6
	5-12	Silt loam, silty clay loam.	CL	A-6, A-4	100	100	95-100	90-100	27-40	8-19
	12-17	Silt loam--------	CL-ML, CL	A-4	100	100	95-100	90-100	20-30	5-10
	17-41	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	100	100	95-100	90-100	25-45	5-24
	41-60	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-7, A-4	100	100	95-100	90-100	25-45	5-24
Gu: Gullied land.										
Memphis---------	0-5	Silt loam--------	ML, CL-ML, CL	A-4	100	100	100	90-100	<30	NP-10
	5-20	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	100	90-100	35-48	15-25
	20-60	Silt loam--------	ML, CL	A-4, A-6	100	100	100	90-100	30-40	6-15
Ke--------------- Keyespoint	0-6	Silty clay loam	CL, CH	A-7, A-6	100	100	95-100	85-100	38-55	20-33
	6-24	Clay, silty clay	CH	A-7	100	100	95-100	90-100	50-80	28-50
	24-72	Silt loam, loam, fine sandy loam.	ML, CL, CL-ML, SM	A-4, A-6	100	100	85-100	40-90	<40	NP-20
Kp--------------- Keyespoint	0-8	Silty clay-------	CH	A-7	100	100	95-100	90-100	50-80	28-50
	8-30	Clay, silty clay	CH	A-7	100	100	95-100	90-100	50-80	28-50
	30-62	Silt loam, loam, fine sandy loam.	ML, CL, CL-ML, SM	A-4, A-6	100	100	85-100	40-90	<40	NP-20
	62-72	Loamy fine sand, loamy sand.	SM, SM-SC	A-2, A-3	100	95-100	50-85	15-35	---	NP
LoB2, LoC2------- Loring	0-7	Silt loam--------	ML, CL-ML, CL	A-4, A-6	100	100	95-100	90-100	<35	NP-15
	7-24	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	100	100	95-100	90-100	32-48	8-20
	24-62	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	100	100	95-100	90-100	30-45	8-22

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In								Pct	
LoB3, LoC3, LoD3-- Loring	0-6	Silt loam--------	ML, CL-ML, CL	A-4, A-6	100	100	95-100	90-100	<35	NP-15
	6-17	Silt loam, silty clay loam.	CL, ML	A-6, A-7, A-4	100	100	95-100	90-100	32-48	8-20
	17-53	Silt loam, silty clay loam.	CL, ML	A-4, A-6, A-7	100	100	95-100	90-100	30-45	8-22
	53-62	Silt loam--------	CL, ML	A-4, A-6, A-7	100	100	95-100	70-100	28-45	7-20
MeB2, MeC2------- Memphis	0-6	Silt loam--------	ML, CL-ML, CL	A-4	100	100	100	90-100	<30	NP-10
	6-24	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	100	90-100	35-48	15-25
	24-62	Silt loam--------	ML, CL	A-4, A-6	100	100	100	90-100	30-40	6-15
MeD3, MeE3------- Memphis	0-6	Silt loam--------	ML, CL-ML, CL	A-4	100	100	100	90-100	<30	NP-10
	6-14	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	100	90-100	35-48	15-25
	14-60	Silt loam--------	ML, CL	A-4, A-6	100	100	100	90-100	30-40	6-15
MeF-------------- Memphis	0-6	Silt loam--------	ML, CL-ML, CL	A-4	100	100	100	90-100	<30	NP-10
	6-24	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	100	90-100	35-48	15-25
	24-62	Silt loam--------	ML, CL	A-4, A-6	100	100	100	90-100	30-40	6-15
Mo--------------- Morganfield	0-9	Silt loam--------	ML, CL, CL-ML	A-4	100	100	95-100	65-95	<30	NP-10
	9-60	Silt loam, silt, very fine sandy loam.	ML, CL, CL-ML	A-4	100	100	95-100	65-95	<30	NP-10
Op--------------- Openlake	0-7	Silty clay loam	CH, CL	A-7	100	100	95-100	85-100	45-60	25-35
	7-75	Silty clay, clay	CH	A-7	100	100	95-100	90-100	55-80	33-50
Os--------------- Openlake	0-7	Silty clay-------	CH	A-7	100	100	95-100	90-100	55-80	33-50
	7-75	Silty clay, clay	CH	A-7	100	100	95-100	90-100	55-80	33-50
Rb--------------- Robinsonville	0-7	Fine sandy loam	SM, ML	A-4	100	100	85-95	40-55	<25	NP-3
	7-62	Stratified fine sandy loam to loamy fine sand.	SM, ML	A-2, A-4	100	95-100	75-95	30-65	<25	NP-3
Rc--------------- Robinsonville	0-7	Silt loam--------	SM, ML	A-4	100	95-100	85-95	35-80	<25	NP-3
	7-62	Stratified fine sandy loam to loamy fine sand.	SM, ML	A-2, A-4	100	95-100	75-95	30-65	<25	NP-3
Rd--------------- Robinsonville	0-8	Silty clay loam	CL	A-6, A-7	100	100	90-100	85-95	30-42	11-20
	8-62	Stratified fine sandy loam to silt loam.	SM, ML	A-4	100	95-100	75-95	35-65	<25	NP-3
Ro--------------- Rosebloom	0-5	Silt loam--------	CL	A-4, A-6	100	100	90-100	80-95	28-40	9-20
	5-72	Silt loam, silty clay loam.	CL	A-6, A-7	100	100	90-100	85-100	28-45	11-25

TABLE 15.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	4	10	40	200		
	In								Pct	
Rt, Ru----------- Routon	0-15	Silt loam--------	ML, CL, CL-ML	A-4, A-6	100	100	90-100	85-95	16-32	3-12
	15-56	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	100	100	90-100	90-95	20-40	5-17
	56-72	Silt loam--------	ML, CL, CL-ML	A-4, A-6	100	100	90-100	85-95	16-32	3-12
Sh--------------- Sharkey	0-5	Clay-------------	CH, CL	A-7	100	100	100	95-100	46-85	22-50
	5-60	Clay-------------	CH	A-7	100	100	100	95-100	56-85	30-50
Tu--------------- Tunica	0-4	Clay-------------	CH	A-7	100	98-100	95-100	90-100	50-92	25-62
	4-30	Clay, silty clay	CH	A-7	100	98-100	95-100	90-100	50-92	25-62
	30-60	Fine sandy loam, loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	100	95-100	65-100	51-100	<40	NP-20
UD. Udults										
UO: Udults.										
Udorthents.										

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Ad: Adler	0-6	10-25	1.50-1.55	0.6-2.0	0.20-0.23	5.6-7.3	Low	0.43	5	.5-2
	6-60	5-18	1.50-1.55	0.6-2.0	0.20-0.23	5.6-7.3	Low	0.43		
Am: Amagon	0-10	35-45	1.30-1.50	0.06-0.2	---	5.1-6.5	High	0.37	5	1-3
	10-16	18-27	1.25-1.50	0.6-2.0	0.16-0.24	5.1-6.5	Low	0.43		
	16-46	20-35	1.25-1.50	0.06-0.2	0.16-0.24	5.1-6.5	Moderate	0.37		
	46-62	20-35	1.25-1.60	0.06-0.6	0.15-0.24	6.1-7.3	Low	0.37		
AO:										
Amagon	0-25	18-25	1.25-1.50	0.6-2.0	0.16-0.24	5.1-6.5	Low	0.43	5	---
	25-56	20-35	1.25-1.50	0.06-0.2	0.16-0.24	5.1-6.5	Moderate	0.37		
	56-72	20-35	1.25-1.60	0.06-0.6	0.15-0.24	6.1-7.3	Low	0.43		
Oaklimeter	0-8	10-16	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low	0.43	5	.5-2
	8-72	7-30	1.40-1.50	0.6-2.0	0.20-0.20	4.5-5.5	Low	0.43		
Ar: Arkabutla	0-5	5-25	1.40-1.50	0.6-2.0	0.20-0.22	4.5-5.5	Low	0.43	5	1-3
	5-65	20-35	1.45-1.55	0.6-2.0	0.18-0.21	4.5-5.5	Low	0.32		
As: Askew	0-9	15-27	1.30-1.55	0.6-2.0	0.20-0.24	4.5-6.0	Low	0.43	5	1-3
	9-38	20-35	1.25-1.60	0.6-2.0	0.15-0.24	4.5-6.0	Moderate	0.32		
	38-60	10-25	1.35-1.60	0.6-6.0	0.10-0.22	4.5-6.0	Low	0.24		
Aw: Askew	0-10	27-37	1.30-1.55	0.2-0.6	0.18-0.22	5.1-6.5	Moderate	0.37	5	1-3
	10-48	20-35	1.25-1.60	0.6-2.0	0.15-0.24	4.5-6.0	Moderate	0.32		
	48-62	10-25	1.35-1.60	2.0-6.0	0.10-0.22	4.5-6.0	Low	0.24		
Bo: Bowdre	0-18	35-60	1.40-1.50	0.06-0.2	0.15-0.20	6.1-7.8	High	0.37	3	1-3
	18-40	10-25	1.50-1.55	0.2-0.6	0.19-0.22	6.1-7.8	Low	0.32		
	40-60	7-25	1.50-1.55	0.6-2.0	0.15-0.22	6.1-7.8	Low	0.32		
Br: Bruno	0-6	4-8	1.40-1.60	6.0-20	0.05-0.10	5.6-8.4	Low	0.15	5	.5-2
	6-48	2-8	1.40-1.60	6.0-20	0.05-0.10	5.6-8.4	Low	0.15		
	48-73	2-8	1.40-1.60	6.0-20	0.02-0.05	5.6-8.4	Very low	0.10		
Bs: Bruno	0-9	24-38	1.30-1.50	0.6-2.0	0.17-0.22	5.6-8.4	Moderate	0.28	5	.5-2
	9-60	2-10	1.40-1.60	6.0-20	0.05-0.10	5.6-8.4	Low	0.15		
Ca: Calloway	0-27	10-30	1.40-1.55	0.6-2.0	0.20-0.23	4.5-6.0	Low	0.49	3	.5-2
	27-53	10-32	1.35-1.55	0.06-0.2	0.09-0.12	4.5-6.0	Low	0.43		
	53-62	16-32	1.45-1.55	0.06-0.2	0.09-0.12	5.1-7.3	Low	0.43		
Ce: Center	0-15	12-24	1.35-1.50	0.6-2.0	0.18-0.22	5.1-6.5	Low	0.49	5	1-3
	15-50	18-32	1.30-1.50	0.2-0.6	0.16-0.20	5.1-6.5	Low	0.43		
	50-62	15-25	1.30-1.50	0.2-0.6	0.16-0.20	5.6-7.3	Low	0.49		
Cm: Commerce	0-11	14-27	1.35-1.65	0.6-2.0	0.21-0.23	6.1-7.8	Low	0.43	5	.5-4
	11-62	14-39	1.35-1.65	0.2-0.6	0.20-0.22	6.1-7.8	Moderate	0.32		
Co: Commerce	0-7	27-39	1.45-1.70	0.2-0.6	0.20-0.22	6.1-7.8	Moderate	0.37	5	.5-4
	7-62	14-39	1.35-1.65	0.2-0.6	0.20-0.22	6.1-7.8	Moderate	0.32		
Cs: Commerce	0-11	14-27	1.35-1.65	0.6-2.0	0.21-0.23	6.1-7.8	Low	0.43	5	.5-4
	11-62	14-39	1.35-1.65	0.2-0.6	0.20-0.22	6.1-7.8	Moderate	0.32		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Ct---------------- Convent	0-7	0-18	1.30-1.65	0.6-2.0	0.18-0.23	5.6-7.3	Low----------	0.43	5	.5-2
	7-62	0-18	1.30-1.65	0.6-2.0	0.20-0.23	6.1-7.3	Low----------	0.37		
Cv---------------- Crevasse	0-7	5-12	1.45-1.55	6.0-20	0.06-0.10	5.6-7.8	Low----------	0.17	5	.5-2
	7-65	2-8	1.40-1.50	6.0-20	0.02-0.06	5.6-7.8	Low----------	0.15		
De---------------- Dekoven	0-30	18-35	1.20-1.40	0.6-2.0	0.18-0.23	6.1-7.8	Low----------	0.32	5	2-10
	30-72	18-35	1.25-1.50	0.6-2.0	0.18-0.23	6.1-7.8	Low----------	0.37		
Du---------------- Dubbs	0-5	5-18	1.40-1.50	0.6-2.0	0.20-0.22	4.5-6.0	Low----------	0.37	5	.5-2
	5-42	20-35	1.45-1.55	0.6-2.0	0.18-0.22	4.5-6.0	Moderate-----	0.37		
	42-64	10-25	1.40-1.50	2.0-6.0	0.20-0.22	4.5-6.0	Low----------	0.37		
Dv---------------- Dundee	0-13	27-40	1.30-1.65	0.2-0.6	0.15-0.20	5.1-6.5	Moderate-----	0.37	5	1-2
	13-21	10-30	1.30-1.70	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.37		
	21-60	18-34	1.30-1.70	0.2-0.6	0.15-0.20	4.5-6.0	Moderate-----	0.32		
Dw---------------- Dundee	0-17	40-55	1.30-1.60	0.06-0.2	0.13-0.18	5.1-6.5	High---------	0.32	5	1-2
	17-22	10-30	1.30-1.70	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.37		
	22-57	18-34	1.30-1.70	0.2-0.6	0.15-0.20	4.5-6.0	Moderate-----	0.32		
	57-62	18-25	1.30-1.70	0.6-2.0	0.15-0.20	4.5-6.0	Low----------	0.32		
GrB2, GrC2-------- Grenada	0-6	12-16	1.40-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.49	3	.5-2
	6-20	18-30	1.40-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.43		
	20-25	12-16	1.35-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.49		
	25-47	15-32	1.45-1.60	0.06-0.2	0.10-0.12	4.5-6.0	Low----------	0.37		
	47-60	15-32	1.45-1.60	0.06-0.2	0.10-0.12	5.1-6.5	Low----------	0.37		
GrB3, GrC3-------- Grenada	0-5	12-16	1.40-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.49	3	.5-2
	5-12	18-30	1.40-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.43		
	12-17	12-16	1.35-1.50	0.6-2.0	0.20-0.23	4.5-6.0	Low----------	0.49		
	17-41	15-32	1.45-1.60	0.06-0.2	0.10-0.12	4.5-6.0	Low----------	0.37		
	41-60	15-32	1.45-1.60	0.06-0.2	0.10-0.12	5.1-6.5	Low----------	0.37		
Gu: Gullied land.										
Memphis----------	0-5	8-22	1.30-1.50	0.6-2.0	0.20-0.23	5.1-6.0	Low----------	0.49	5	1-2
	5-20	20-35	1.30-1.50	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.49		
	20-60	12-25	1.30-1.50	0.6-2.0	0.20-0.23	5.1-6.0	Low----------	0.49		
Ke---------------- Keyespoint	0-6	27-40	1.35-1.55	0.2-0.6	0.16-0.20	5.6-7.8	Moderate-----	0.37	5	1-4
	6-24	40-65	1.30-1.50	<0.06	0.13-0.18	5.6-7.8	High---------	0.32		
	24-72	12-32	1.40-1.55	0.6-2.0	0.14-0.22	5.6-7.8	Low----------	0.32		
Kp---------------- Keyespoint	0-8	40-60	1.30-1.50	0.06-0.2	0.14-0.18	5.6-7.8	High---------	0.32	5	1-4
	8-30	40-65	1.30-1.50	<0.06	0.13-0.18	5.6-7.8	High---------	0.32		
	30-62	12-32	1.40-1.55	0.6-2.0	0.14-0.22	5.6-7.8	Low----------	0.32		
	62-72	5-12	1.45-1.65	2.0-6.0	0.10-0.18	5.6-7.8	Low----------	0.24		
LoB2, LoC2-------- Loring	0-7	8-18	1.30-1.50	0.6-2.0	0.20-0.23	5.1-6.0	Low----------	0.49	3	.5-2
	7-24	18-32	1.40-1.50	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.43		
	24-62	15-30	1.50-1.70	0.06-0.2	0.06-0.13	5.1-6.0	Low----------	0.43		
LoB3, LoC3, LoD3- Loring	0-6	8-18	1.30-1.50	0.6-2.0	0.20-0.23	5.1-6.0	Low----------	0.49	3	.5-2
	6-17	18-32	1.40-1.50	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.43		
	17-53	15-30	1.50-1.70	0.06-0.2	0.06-0.13	5.1-6.0	Low----------	0.43		
	53-62	10-25	1.30-1.60	0.2-2.0	0.06-0.13	5.1-6.0	Low----------	0.43		

TABLE 16.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH				Pct
MeB2, MeC2-------Memphis	0-6	8-22	1.30-1.50	0.6-2.0	0.20-0.23	5.1-6.0	Low----------	0.49	5	1-2
	6-24	20-35	1.30-1.50	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.49		
	24-62	12-25	1.30-1.50	0.6-2.0	0.20-0.23	5.1-6.0	Low----------	0.49		
MeD3, MeE3-------Memphis	0-6	8-22	1.30-1.50	0.6-2.0	0.20-0.23	5.1-6.0	Low----------	0.49	5	1-2
	6-14	20-35	1.30-1.50	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.49		
	14-60	12-25	1.30-1.50	0.6-2.0	0.20-0.23	5.1-6.0	Low----------	0.49		
MeF--------------Memphis	0-6	8-22	1.30-1.50	0.6-2.0	0.20-0.23	5.1-6.0	Low----------	0.49	5	1-2
	6-24	20-35	1.30-1.50	0.6-2.0	0.20-0.22	5.1-6.0	Low----------	0.49		
	24-62	12-25	1.30-1.50	0.6-2.0	0.20-0.23	5.1-6.0	Low----------	0.49		
Mo---------------Morganfield	0-9	2-5	1.40-1.50	0.6-2.0	0.20-0.23	5.6-7.8	Low----------	0.43	5	1-3
	9-60	5-18	1.40-1.55	0.6-2.0	0.20-0.23	5.6-7.8	Low----------	0.43		
Op---------------Openlake	0-7	30-40	1.30-1.65	<0.06	0.16-0.20	5.1-7.8	High---------	0.37	5	1-4
	7-75	40-65	1.35-1.60	<0.06	0.13-0.17	5.1-7.8	High---------	0.32		
Os---------------Openlake	0-7	40-60	1.30-1.60	<0.06	0.14-0.18	5.1-7.8	High---------	0.32	5	1-4
	7-75	40-65	1.35-1.60	<0.06	0.13-0.17	5.1-7.8	High---------	0.32		
Rb---------------Robinsonville	0-7	2-10	1.40-1.50	2.0-6.0	0.15-0.18	6.1-7.8	Low----------	0.28	5	.5-2
	7-62	5-15	1.50-1.60	0.6-6.0	0.14-0.18	6.1-7.8	Low----------	0.32		
Rc---------------Robinsonville	0-7	2-10	1.40-1.50	2.0-6.0	0.15-0.22	6.1-7.8	Low----------	0.32	5	.5-2
	7-62	5-15	1.50-1.60	0.6-6.0	0.14-0.18	6.1-7.8	Low----------	0.32		
Rd---------------Robinsonville	0-8	27-38	1.30-1.50	0.6-2.0	0.16-0.20	6.1-7.8	Moderate-----	0.32	5	.5-2
	8-62	5-15	1.45-1.60	0.6-6.0	0.14-0.18	6.1-7.8	Low----------	0.32		
Ro---------------Rosebloom	0-5	18-25	1.40-1.55	0.6-2.0	0.20-0.22	4.5-5.5	Low----------	0.43	5	1-3
	5-72	20-32	1.40-1.55	0.6-2.0	0.18-0.21	4.5-5.5	Low----------	0.37		
Rt, Ru-----------Routon	0-15	15-25	1.40-1.55	0.6-2.0	0.20-0.24	5.1-6.5	Low----------	0.49	5	.5-2
	15-56	20-35	1.35-1.50	0.06-0.2	0.18-0.22	5.1-6.5	Low----------	0.49		
	56-72	18-27	1.35-1.55	0.06-0.2	0.20-0.24	5.6-7.3	Low----------	0.49		
Sh---------------Sharkey	0-5	40-60	1.20-1.50	<0.06	0.12-0.18	5.6-7.8	Very high----	0.32	5	.5-4
	5-60	60-90	1.20-1.50	<0.06	0.12-0.18	5.6-7.8	Very high----	0.28		
Tu---------------Tunica	0-4	35-75	1.45-1.55	<0.06	0.15-0.20	5.6-7.8	High---------	0.32	5	1-3
	4-30	35-75	1.45-1.55	<0.06	0.15-0.20	5.6-7.8	High---------	0.32		
	30-60	10-32	1.40-1.50	0.06-2.0	0.10-0.22	5.6-7.8	Low----------	0.32		
UD. Udults										
UO: Udults.										
Udorthents.										

TABLE 17.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydrologic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
Ad: Adler	C	Occasional	Brief	Jan-Mar	2.0-3.0	Apparent	Jan-Apr	Moderate	Low.
Am: Amagon	D	Frequent	Brief to long.	Feb-Apr	1.0-2.0	Apparent	Dec-Apr	High	High.
AO:									
Amagon	D	Frequent	Brief to very long.	Dec-Apr	1.0-2.0	Perched	Dec-Apr	High	High.
Oaklimeter	C	Frequent	Brief to very long.	Dec-Apr	1.5-2.5	Apparent	Dec-Apr	Moderate	High.
Ar: Arkabutla	C	Frequent	Brief to very long.	Dec-Apr	1.0-1.5	Apparent	Jan-Apr	High	High.
As, Aw: Askew	C	Occasional	Brief	Feb-Apr	1.0-2.0	Apparent	Dec-Apr	High	Moderate.
Bo: Bowdre	C	Occasional	Brief to long.	Feb-Apr	1.5-2.0	Perched	Jan-Apr	High	Low.
Br, Bs: Bruno	A	Occasional	Brief	Feb-Apr	4.0-6.0	Apparent	Dec-Apr	Low	Low.
Ca: Calloway	C	None	---	---	1.0-2.0	Perched	Jan-Apr	High	Moderate.
Ce: Center	C	None	---	---	1.0-2.5	Apparent	Dec-Mar	High	Moderate.
Cm, Co: Commerce	C	Occasional	Brief to long.	Feb-Apr	1.5-4.0	Apparent	Dec-Apr	High	Low.
Cs: Commerce	C	Frequent	Brief to long.	Feb-May	1.5-4.0	Apparent	Dec-Apr	High	Low.
Ct: Convent	C	Occasional	Brief to long.	Dec-Apr	1.5-4.0	Apparent	Dec-Apr	High	Low.
Cv: Crevasse	A	Occasional	Brief	Feb-Apr	3.5-6.0	Apparent	Dec-Apr	Low	Moderate.
De: Dekoven	D	Rare	---	---	0-1.0	Apparent	Jan-Apr	Moderate	Low.
Du: Dubbs	C	Occasional	Brief	Feb-Apr	4.0-6.0	Apparent	Jan-Apr	Moderate	Moderate.
Dv, Dw: Dundee	C	Occasional	Brief to long.	Feb-Apr	1.5-3.5	Apparent	Jan-Apr	High	Moderate.

TABLE 17.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Uncoated steel	Concrete
					Ft				
GrB2, GrB3, GrC2, GrC3------------- Grenada	C	None--------	---	---	1.5-2.5	Perched	Jan-Apr	Moderate	Moderate.
Gu: Gullied land.									
Memphis----------	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
Ke, Kp----------- Keyespoint	D	Occasional	Brief to long.	Feb-Apr	2.0-3.5	Apparent	Jan-Apr	High-----	Low.
LoB2, LoB3, LoC2, LoC3, LoD3------- Loring	C	None--------	---	---	2.0-3.0	Perched	Dec-Mar	Moderate	Moderate.
MeB2, MeC2, MeD3, MeE3, MeF-------- Memphis	B	None--------	---	---	>6.0	---	---	Moderate	Moderate.
Mo--------------- Morganfield	B	Occasional	Brief-----	Jan-Mar	3.0-4.0	Apparent	Jan-Apr	Low------	Low.
Op, Os----------- Openlake	D	Occasional	Brief to long.	Feb-Apr	1.5-3.0	Apparent	Jan-Apr	High-----	Low.
Rb, Rc----------- Robinsonville	B	Occasional	Brief-----	Feb-Apr	4.0-6.0	Apparent	Jan-Apr	Low------	Low.
Rd--------------- Robinsonville	B	Occasional	Brief to long.	Feb-Apr	4.0-6.0	Apparent	Jan-Apr	Low------	Low.
Ro--------------- Rosebloom	D	Frequent----	Brief to long.	Dec-May	0-1.0	Apparent	Jan-Apr	High-----	Moderate.
Rt--------------- Routon	D	None--------	---	---	0-1.0	Apparent	Dec-Mar	High-----	Moderate.
Ru--------------- Routon	D	Occasional	Very brief	Jan-Mar	0-1.0	Apparent	Dec-Mar	High-----	Moderate.
Sh--------------- Sharkey	D	Frequent----	Brief to very long.	Jan-May	0-2.0	Apparent	Jan-Apr	High-----	Low.
Tu--------------- Tunica	D	Frequent----	Brief to long.	Jan-May	1.5-3.0	Apparent	Jan-Apr	High-----	Low.
UD. Udults									
UO: Udults.									
Udorthents.									

TABLE 18.--CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Adler	Coarse-silty, mixed, nonacid, thermic Aquic Udifluvents
Amagon	Fine-silty, mixed, thermic Typic Ochraqualfs
Arkabutla	Fine-silty, mixed, acid, thermic Aeric Fluvaquents
Askew	Fine-silty, mixed, thermic Aquic Hapludalfs
Bowdre	Clayey over loamy, montmorillonitic, thermic Fluvaquentic Hapludolls
Bruno	Sandy, mixed, thermic Typic Udifluvents
Calloway	Fine-silty, mixed, thermic Glossaquic Fragiudalfs
Center	Fine-silty, mixed, thermic Aquic Hapludalfs
Commerce	Fine-silty, mixed, nonacid, thermic Aeric Fluvaquents
Convent	Coarse-silty, mixed, nonacid, thermic Aeric Fluvaquents
Crevasse	Mixed, thermic Typic Udipsamments
Dekoven	Fine-silty, mixed, thermic Fluvaquentic Haplaquolls
Dubbs	Fine-silty, mixed, thermic Typic Hapludalfs
Dundee	Fine-silty, mixed, thermic Aeric Ochraqualfs
Grenada	Fine-silty, mixed, thermic Glossic Fragiudalfs
Keyespoint	Clayey over loamy, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Loring	Fine-silty, mixed, thermic Typic Fragiudalfs
Memphis	Fine-silty, mixed, thermic Typic Hapludalfs
Morganfield	Coarse-silty, mixed, nonacid, thermic Typic Udifluvents
Oaklimeter	Coarse-silty, mixed, thermic Fluvaquentic Dystrochrepts
Openlake	Fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Robinsonville	Coarse-loamy, mixed, nonacid, thermic Typic Udifluvents
Rosebloom	Fine-silty, mixed, acid, thermic Typic Fluvaquents
Routon	Fine-silty, mixed, thermic Typic Ochraqualfs
Sharkey	Very fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Tunica	Clayey over loamy, montmorillonitic, nonacid, thermic Vertic Haplaquepts

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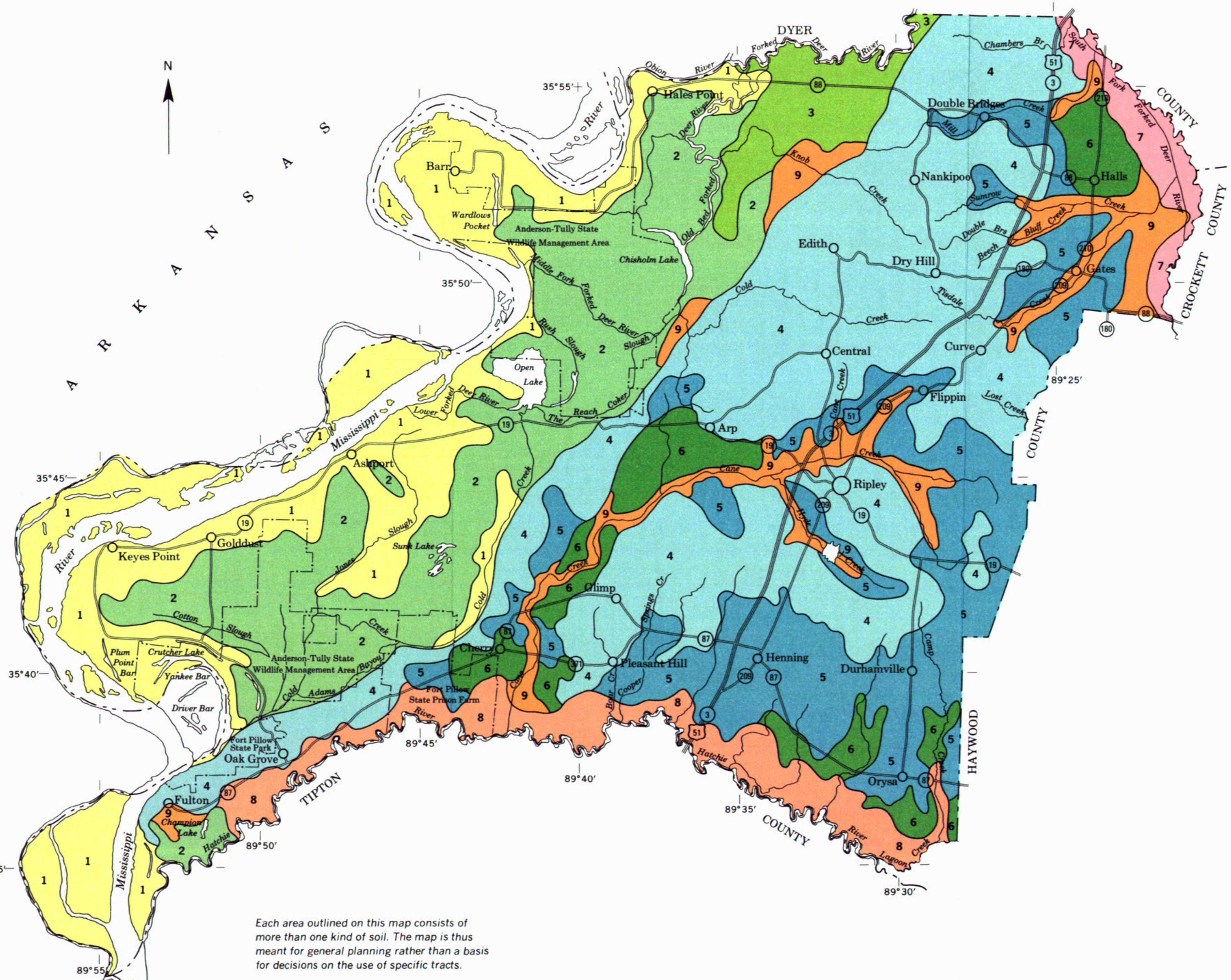


Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

LEGEND

DOMINANTLY NEARLY LEVEL, WELL DRAINED TO POORLY DRAINED SOILS ON THE MISSISSIPPI RIVER FLOOD PLAIN

1 Commerce-Robinsonville: Somewhat poorly drained and well drained, silty or loamy soils, formed in recent alluvium

2 Sharkey-Keyespoint-Openlake: Poorly drained and somewhat poorly drained soils that are clayey or are clayey in the upper part and loamy in the lower part, formed in recent alluvium

3 Dundee-Amagon-Askew: Poorly drained to moderately well drained soils, formed in old loamy alluvium overlain by a layer of silty or clayey recent alluvium

DOMINANTLY GENTLY SLOPING TO STEEP, WELL DRAINED TO SOMEWHAT POORLY DRAINED SOILS ON THE UPLANDS AND NARROW FLOOD PLAINS

4 Memphis-Adler: Gently sloping to steep, well drained, silty soils on the uplands, formed in loess; and nearly level, moderately well drained, silty soils along narrow drainageways, formed in recent alluvium

5 Memphis-Loring: Gently sloping to steep, well drained, silty soils and gently sloping to moderately steep, moderately well drained, silty soils that have a fragipan, formed in loess

6 Grenada-Loring-Calloway: Gently sloping to moderately steep, moderately well drained soils and nearly level, somewhat poorly drained soils; all are silty and have a fragipan, formed in loess

DOMINANTLY NEARLY LEVEL, POORLY DRAINED TO MODERATELY WELL DRAINED SOILS ON THE FLOOD PLAINS

7 Rosebloom-Arkabutla-Adler: Poorly drained to moderately well drained, silty soils, formed in recent alluvium

8 Amagon-Oaklimeter-Adler: Poorly drained, silty soils, formed in old alluvium; moderately well drained, silty soils, formed in recent alluvium over old alluvium; and moderately well drained, silty soils, formed in recent alluvium

9 Adler-Convent-Morganfield: Well drained to somewhat poorly drained, silty soils, formed in recent alluvium

COMPILED 1989

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
TENNESSEE AGRICULTURAL EXPERIMENT STATION

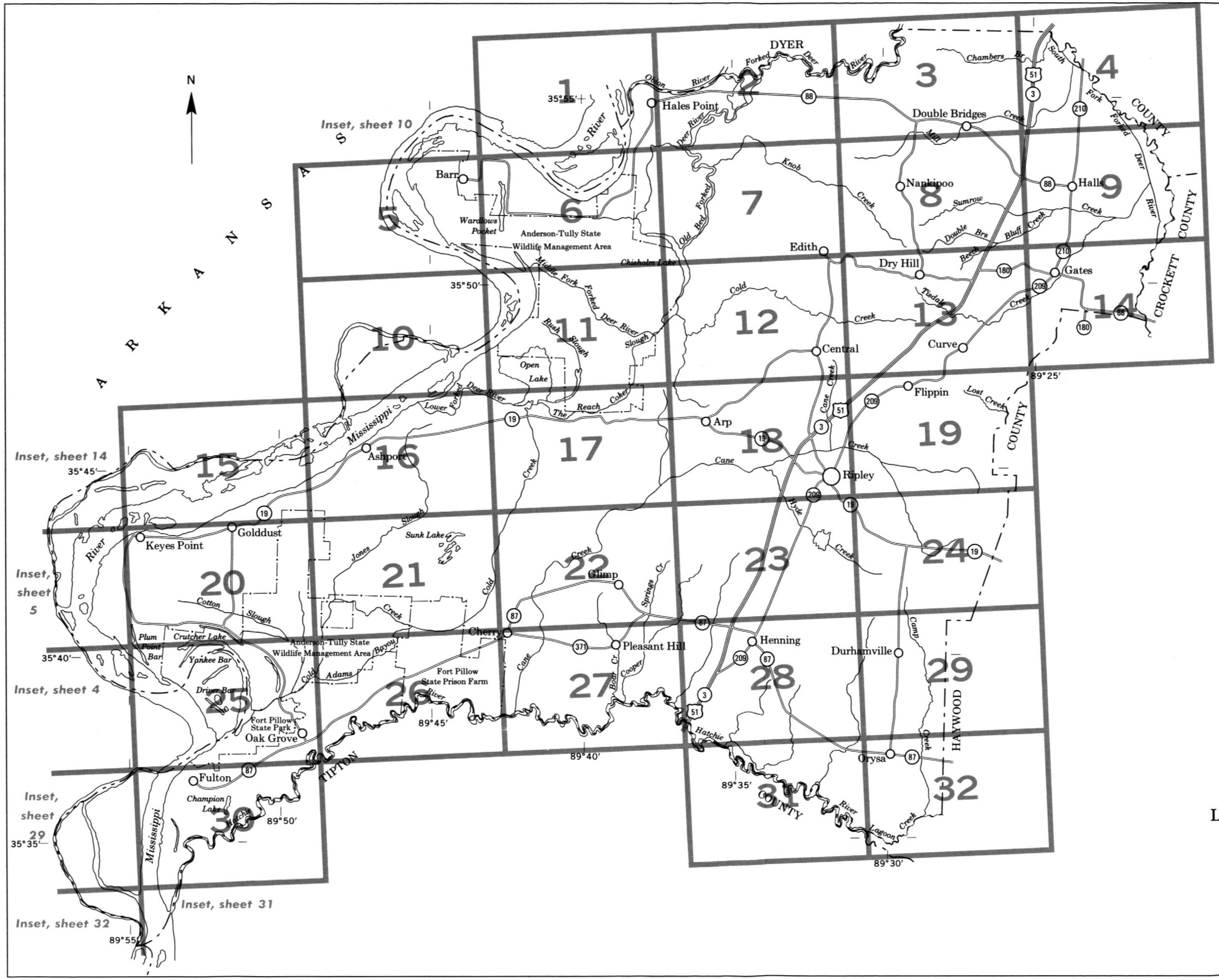
GENERAL SOIL MAP

LAUDERDALE COUNTY, TENNESSEE

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km



INDEX TO MAP SHEETS
LAUDERDALE COUNTY, TENNESSEE

Scale 1:190,080

1 0 1 2 3 Miles

1 0 3 6 Km

SOIL LEGEND

The first letter, always a capital, is the initial letter of the soil name. The second letter is a capital if the mapping unit is broadly defined[1]; otherwise, it is a small letter. The third letter, if used, is always a capital and shows the slope. Symbols without slope letters are those of nearly level soils or miscellaneous areas. A final number, such as 2 in the symbol, shows that the soil is eroded.

SYMBOL	NAME
Ad	Adler silt loam, occasionally flooded
Am	Amagon silty clay loam, overwash, frequently flooded
AO	Amagon overwash and Oaklimeter silt loams, frequently flooded[1]
Ar	Arkabutla silt loam, frequently flooded
As	Askew silt loam, occasionally flooded
Aw	Askew silty clay loam, overwash, occasionally flooded
Bo	Bowdre silty clay, occasionally flooded
Br	Bruno loamy fine sand, occasionally flooded
Bs	Bruno silty clay loam, overwash, occasionally flooded
Ca	Calloway silt loam
Ce	Center silt loam
Cm	Commerce silt loam, occasionally flooded
Co	Commerce silty clay loam, occasionally flooded
Cs	Commerce silt loam, frequently flooded
Ct	Convent silt loam, occasionally flooded
Cv	Crevasse loamy sand, occasionally flooded
De	Dekoven silt loam, overwash, rarely flooded
Du	Dubbs silt loam, occasionally flooded
Dv	Dundee silty clay loam, overwash, occasionally flooded
Dw	Dundee silty clay, overwash, occasionally flooded
GrB2	Grenada silt loam, 2 to 5 percent slopes, eroded
GrB3	Grenada silt loam, 2 to 5 percent slopes, severely eroded
GrC2	Grenada silt loam, 5 to 8 percent slopes, eroded
GrC3	Grenada silt loam, 5 to 8 percent slopes, severely eroded
Gu	Gullied land-Memphis complex, very steep
Ke	Keyespoint silty clay loam, occasionally flooded
Kp	Keyespoint silty clay, occasionally flooded
LoB2	Loring silt loam, 2 to 5 percent slopes, eroded
LoB3	Loring silt loam, 2 to 5 percent slopes, severely eroded
LoC2	Loring silt loam, 5 to 8 percent slopes, eroded
LoC3	Loring silt loam, 5 to 8 percent slopes, severely eroded
LoD3	Loring silt loam, 8 to 12 percent slopes, severely eroded
MeB2	Memphis silt loam, 2 to 5 percent slopes, eroded
MeC2	Memphis silt loam, 5 to 8 percent slopes, eroded
MeD3	Memphis silt loam, 8 to 12 percent slopes, severely eroded
MeE3	Memphis silt loam, 12 to 20 percent slopes, severely eroded
MeF	Memphis silt loam, 20 to 40 percent slopes
Mo	Morganfield silt loam, occasionally flooded
Op	Openlake silty clay loam, occasionally flooded
Os	Openlake silty clay, occasionally flooded
Rb	Robinsonville fine sandy loam, occasionally flooded
Rc	Robinsonville silt loam, occasionally flooded
Rd	Robinsonville silty clay loam, overwash, occasionally flooded
Ro	Rosebloom silt loam, frequently flooded
Rt	Routon silt loam
Ru	Routon silt loam, occasionally flooded
Sh	Sharkey clay, frequently flooded
Tu	Tunica clay, frequently flooded
UD	Udults, sloping[1]
UO	Udults and Udorthents, very steep[1]

[1] The composition of these units is more variable than that of others in the survey area but has been controlled well enough to be interpreted for the expected use of the soils.

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label) — Swift Airport

- Small airport, airfield, park, oilfield, cemetery, or flood pool — FLOOD POOL LINE

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate — 21
- Federal — 173
- State — 28
- County, farm or ranch — 1283

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small — water, w

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) — Indian Mound
- Located object (label) — Tower
- Tank (label) — Gas
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double-line (label) — CANAL
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial — water, w
- Intermittent — int, i

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS — Br Ke

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

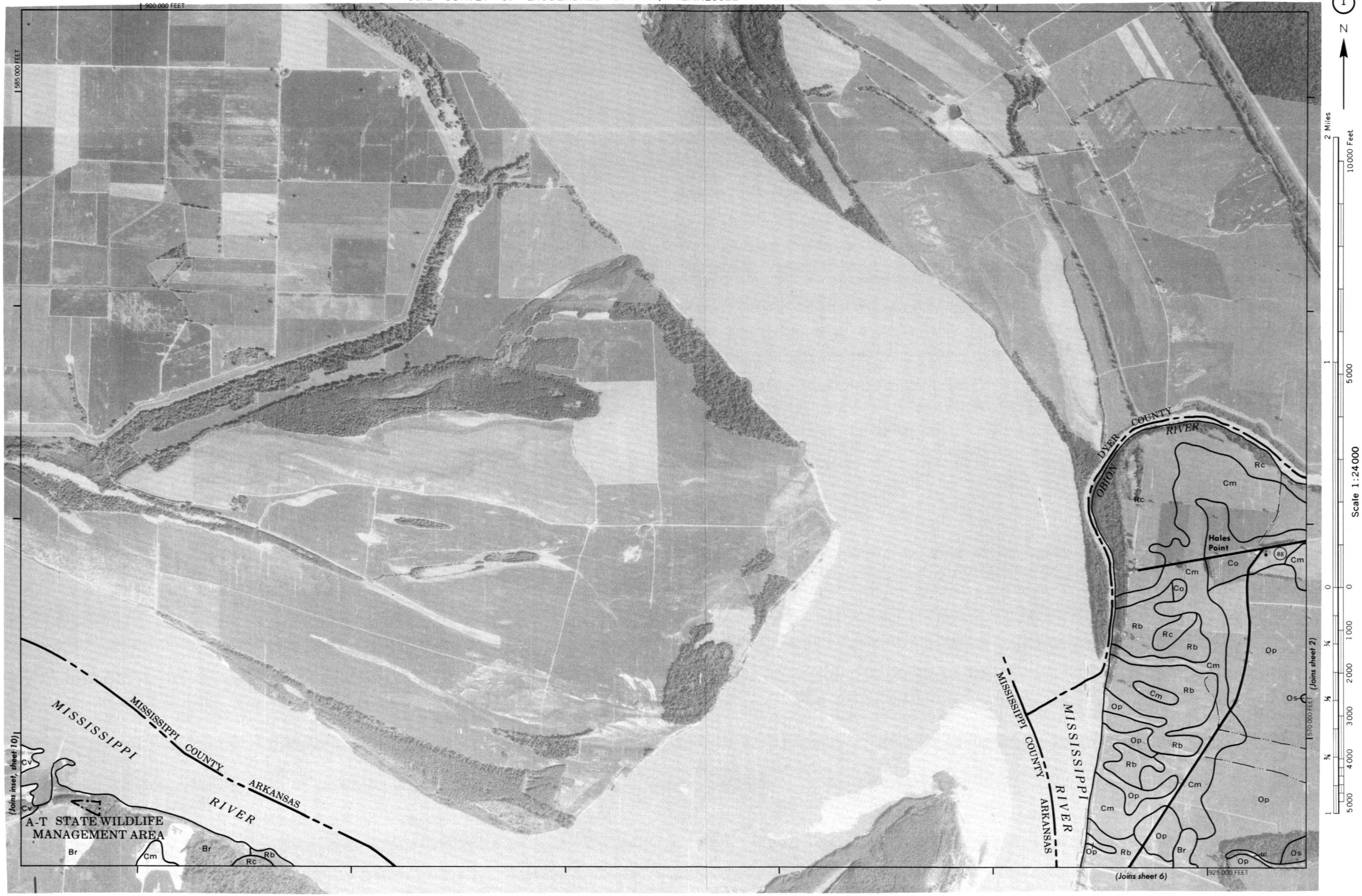
DEPRESSION OR SINK

SOIL SAMPLE (normally not shown) — S

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

SOIL SURVEY OF LAUDERDALE COUNTY, TENNESSEE — SHEET NUMBER 1



LAUDERDALE COUNTY, TENNESSEE NO. 1

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SOIL SURVEY OF LAUDERDALE COUNTY, TENNESSEE — SHEET NUMBER 2

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LAUDERDALE COUNTY, TENNESSEE NO. 2

LAUDERDALE COUNTY, TENNESSEE NO. 3

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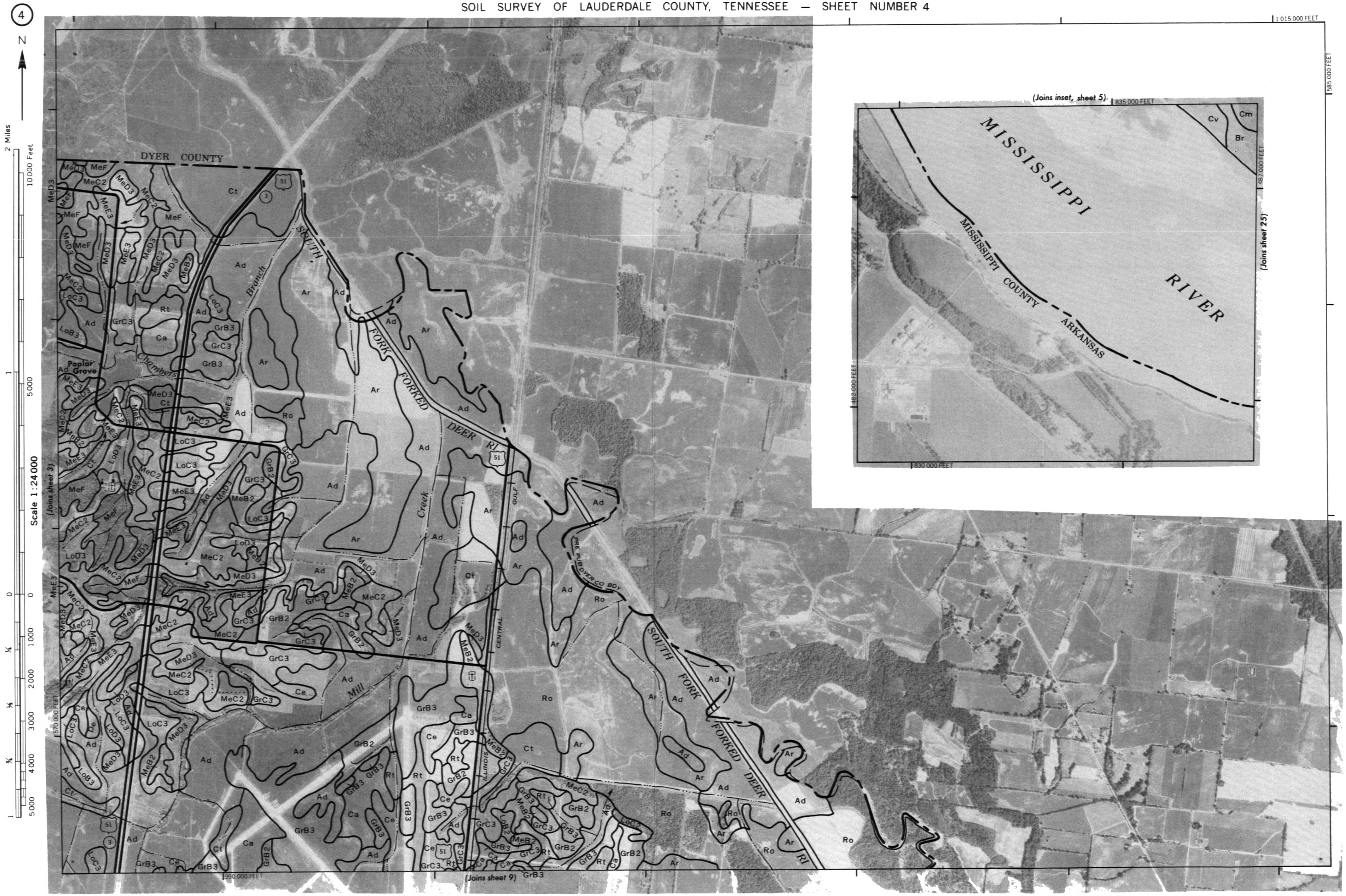

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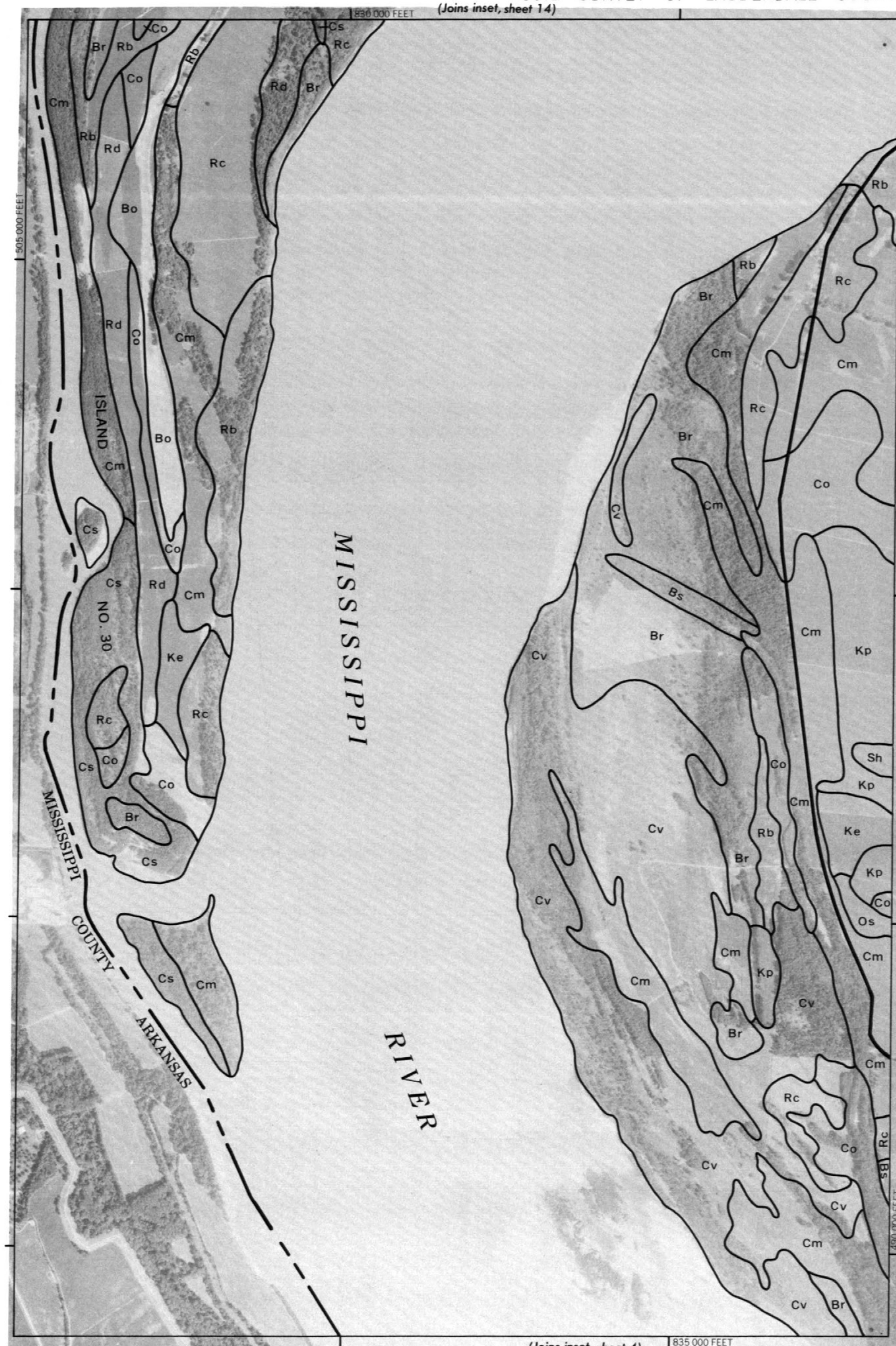

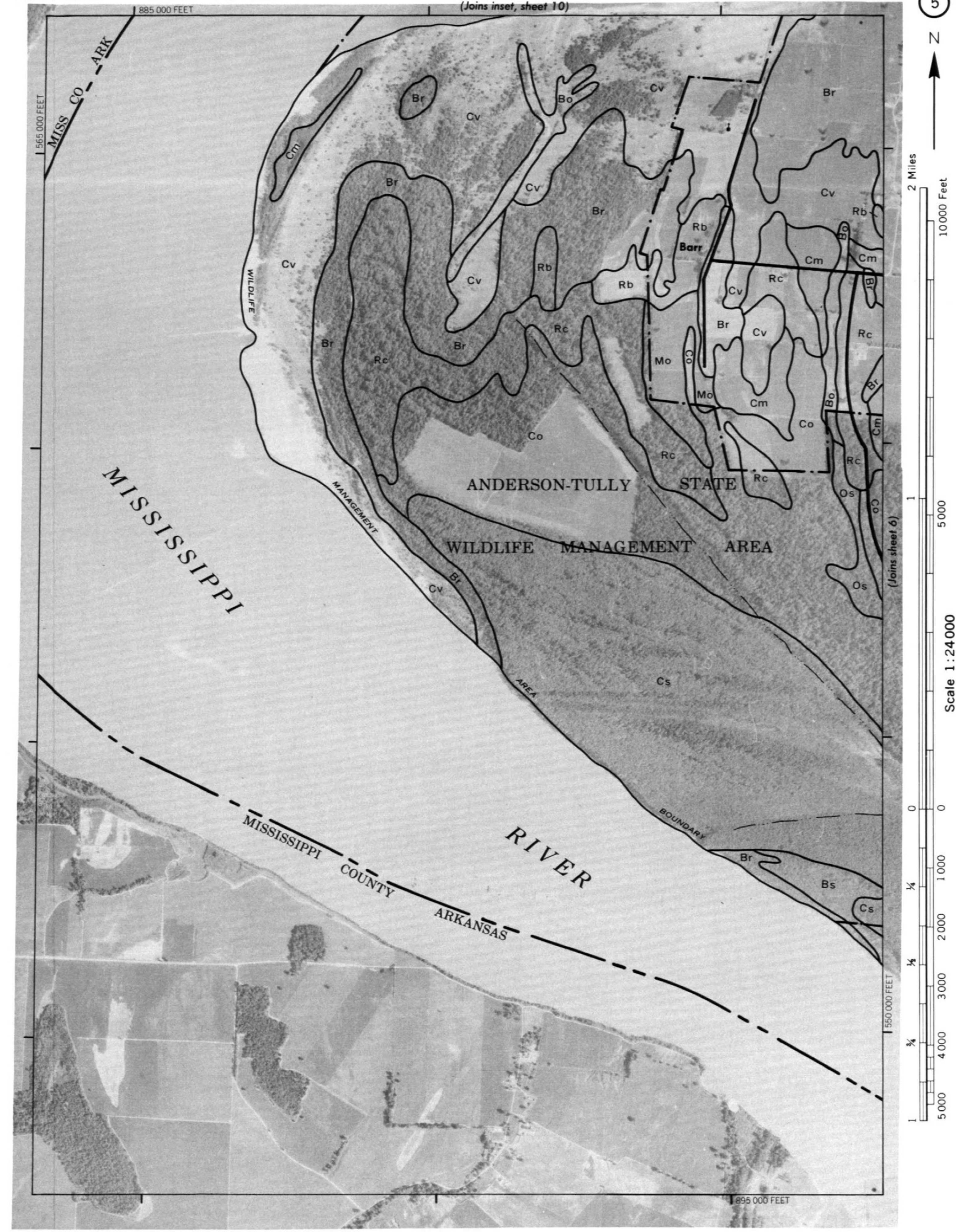

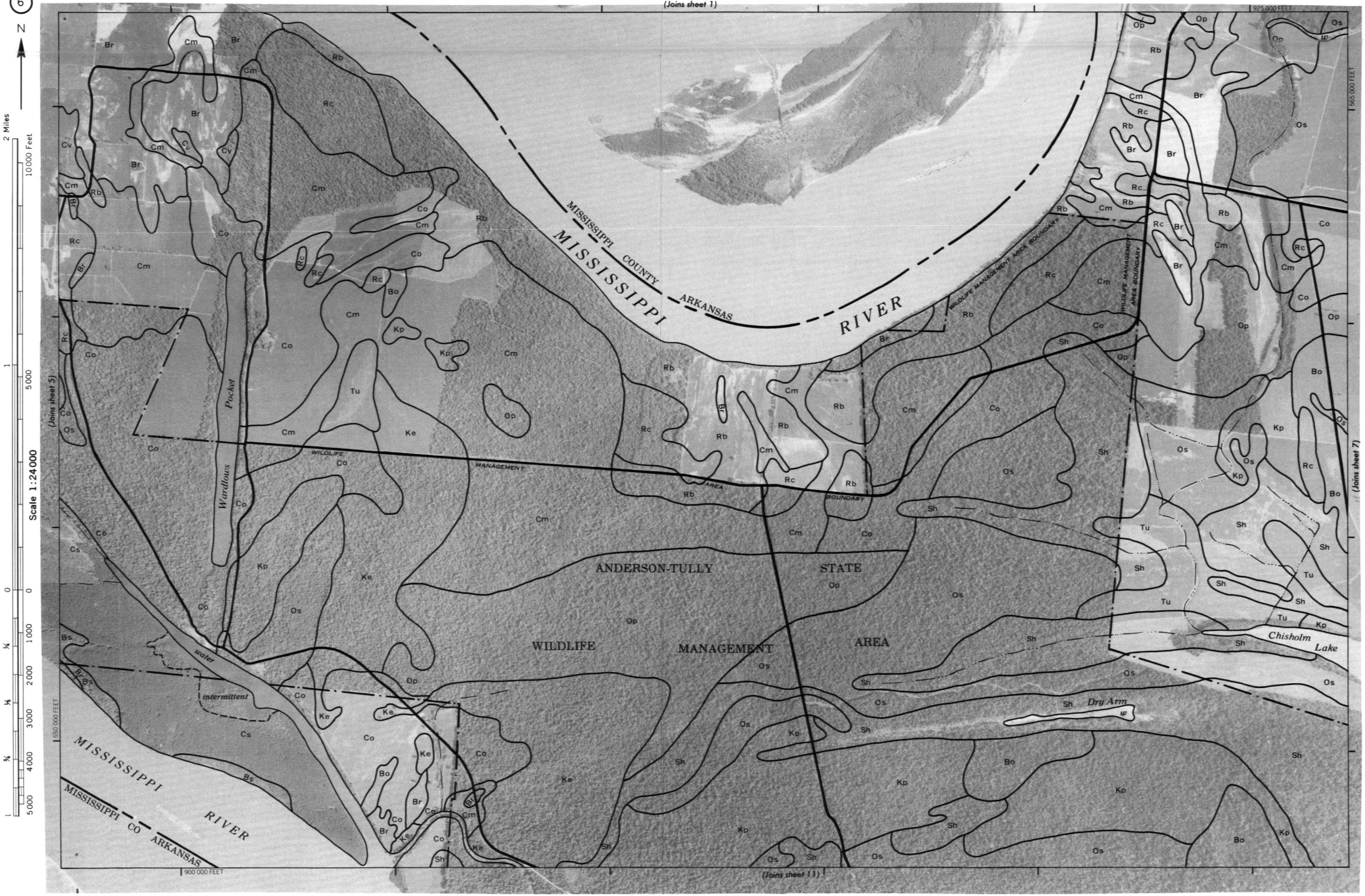

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LAUDERDALE COUNTY, TENNESSEE NO. 7

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LAUDERDALE COUNTY, TENNESSEE NO. 8

SOIL SURVEY OF LAUDERDALE COUNTY, TENNESSEE — SHEET NUMBER 9

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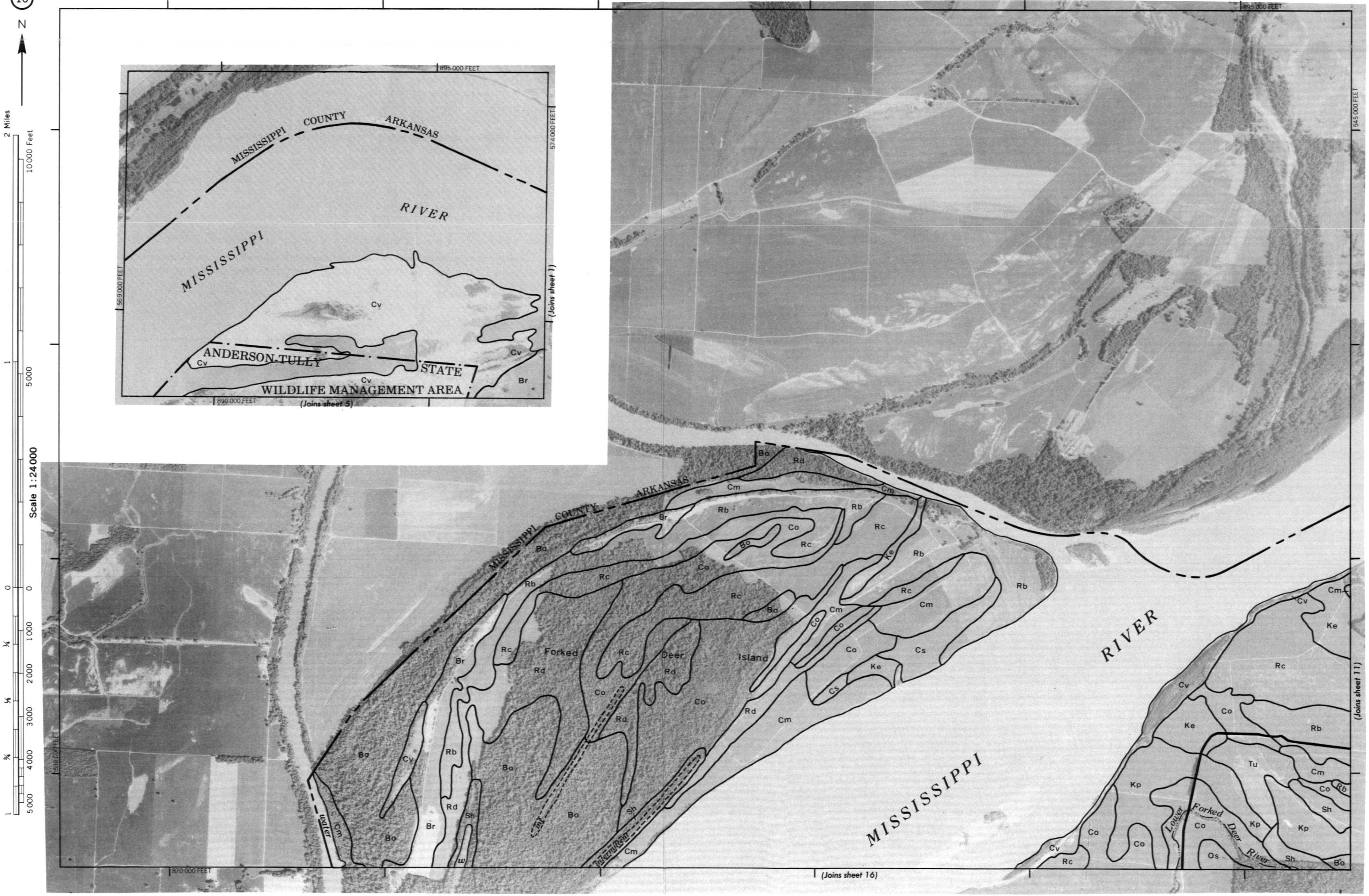

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LAUDERDALE COUNTY, TENNESSEE NO. 10

LAUDERDALE COUNTY, TENNESSEE NO. 11

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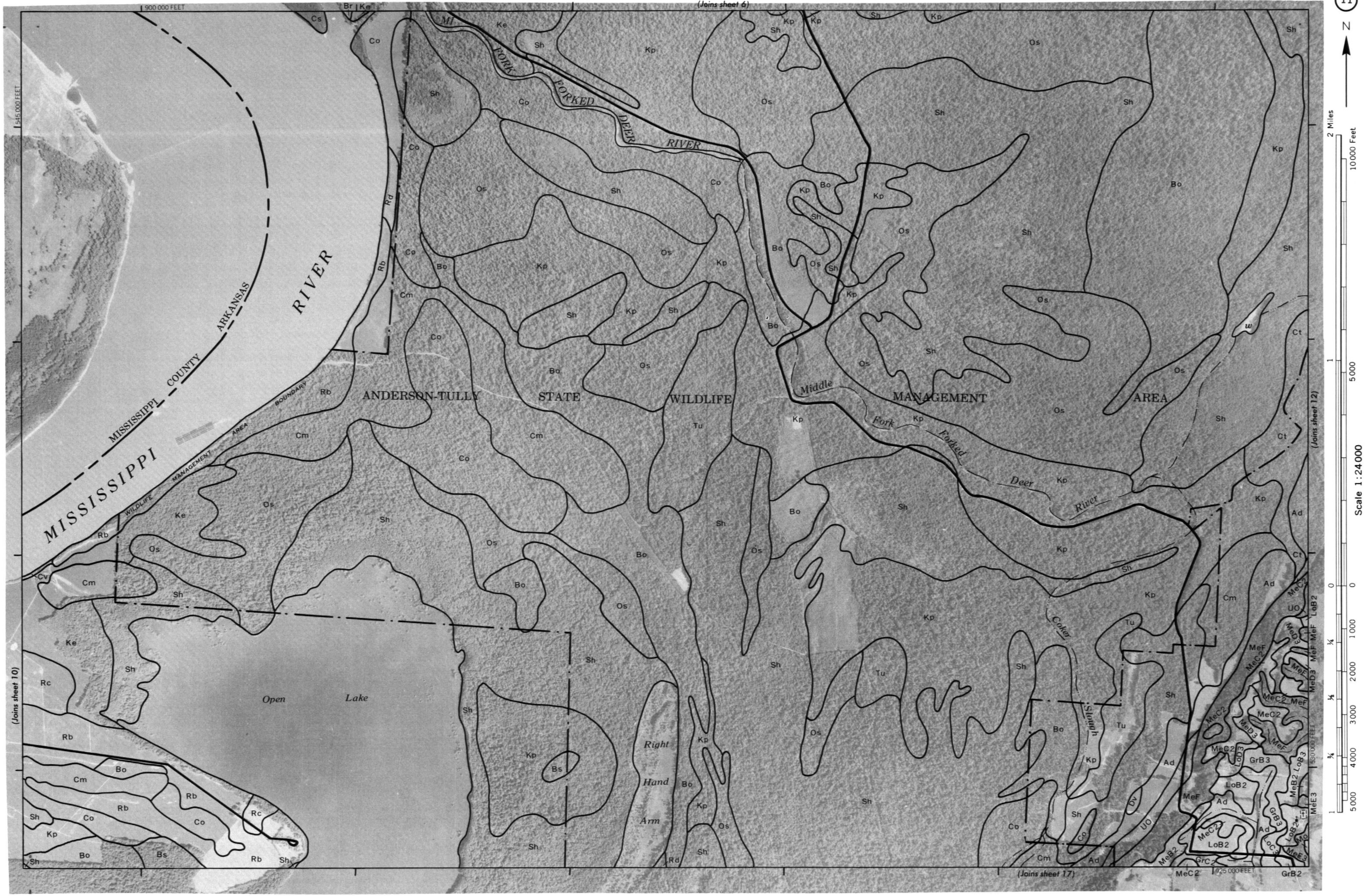
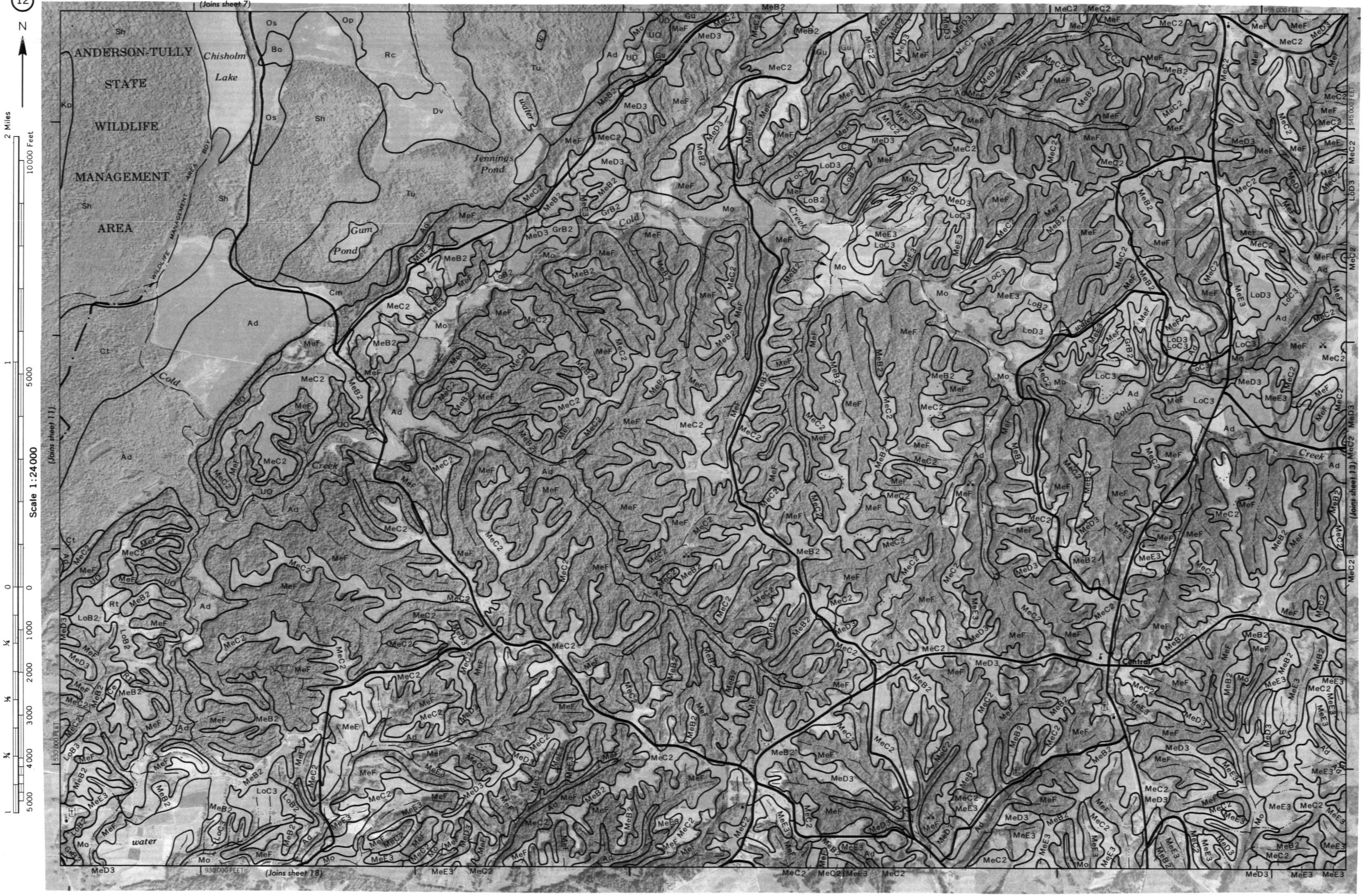


SOIL SURVEY OF LAUDERDALE COUNTY, TENNESSEE — SHEET NUMBER 12



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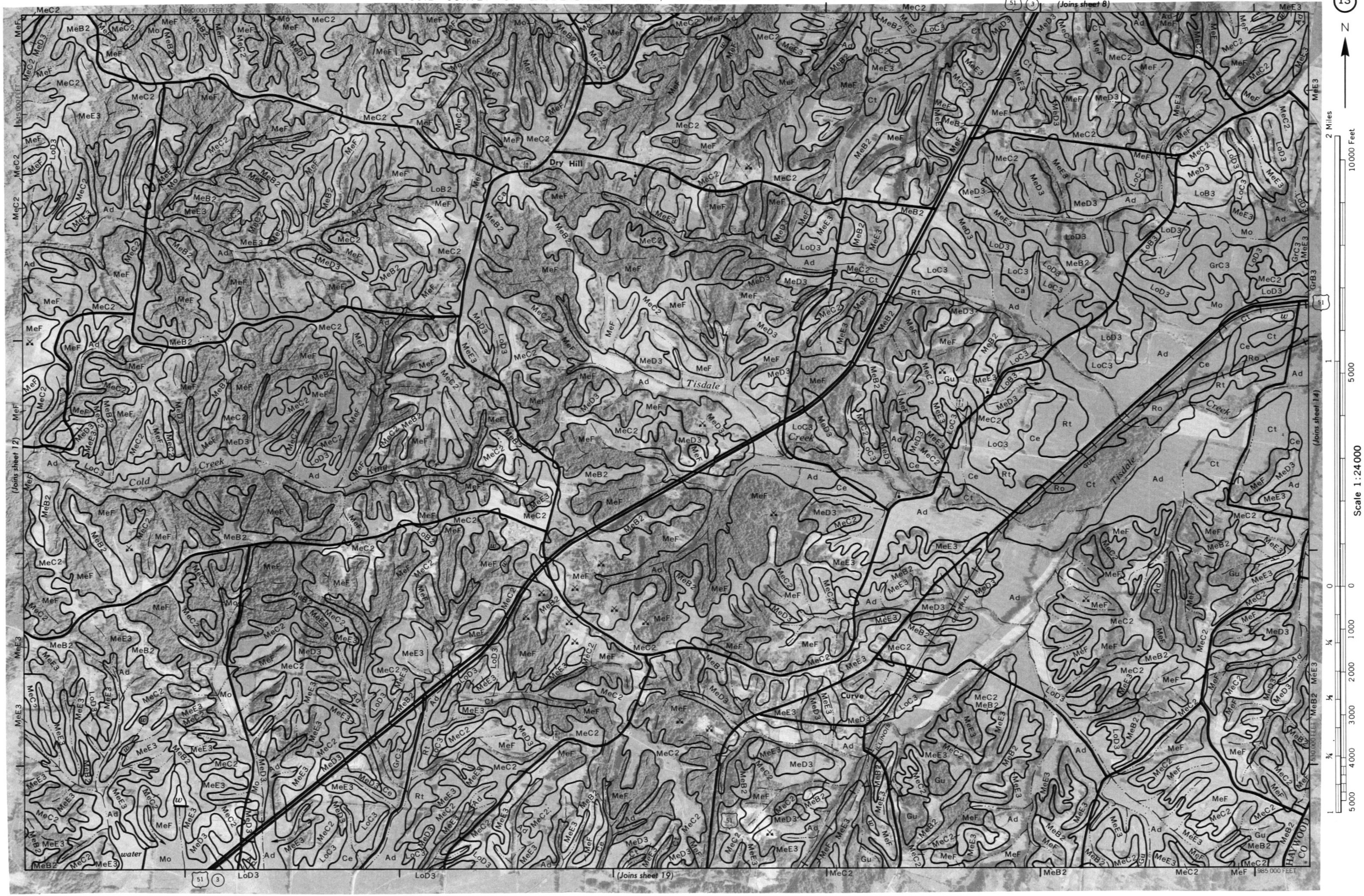
SOIL SURVEY OF LAUDERDALE COUNTY, TENNESSEE — SHEET NUMBER 13



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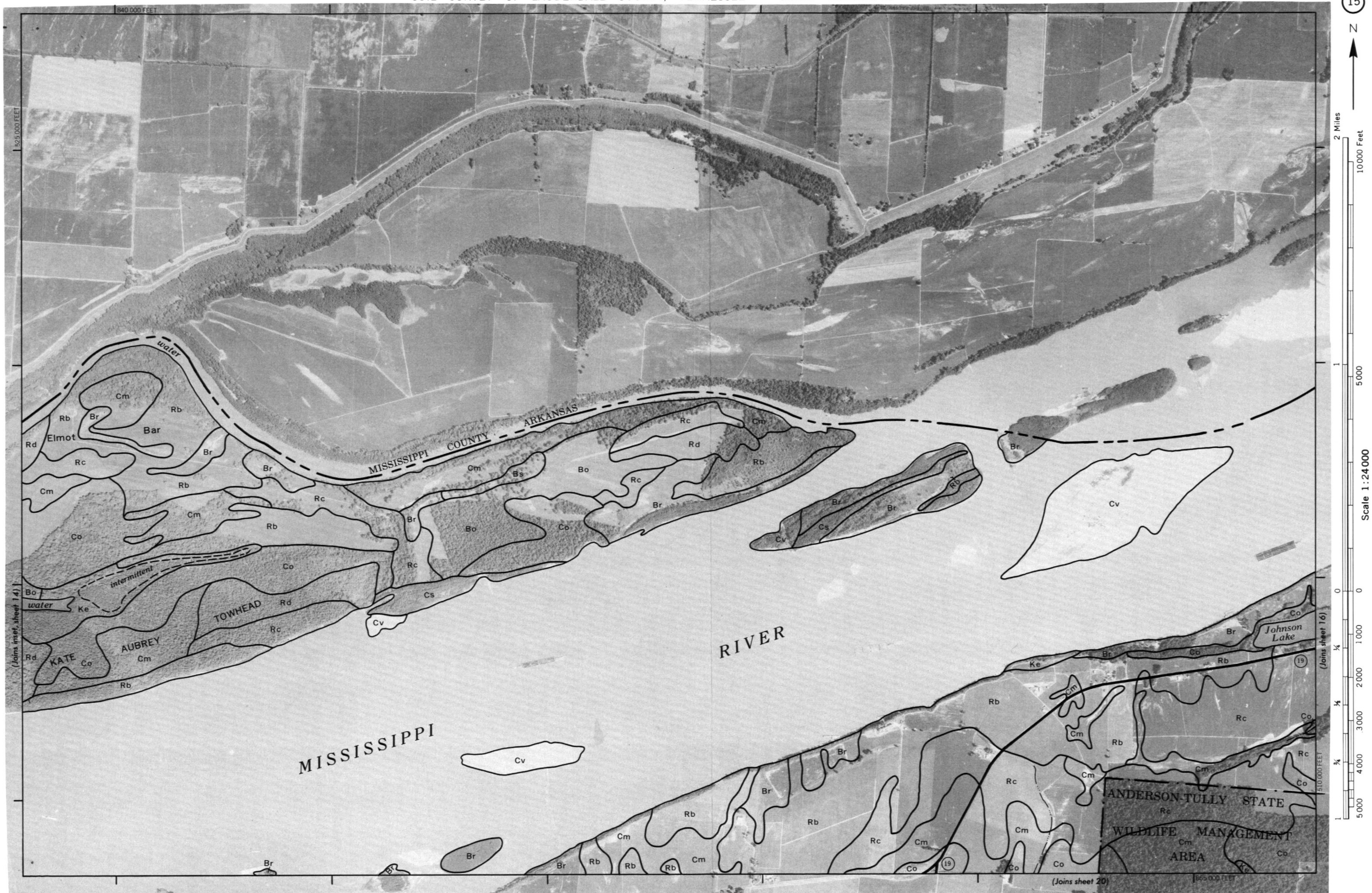

LAUDERDALE COUNTY, TENNESSEE NO. 15

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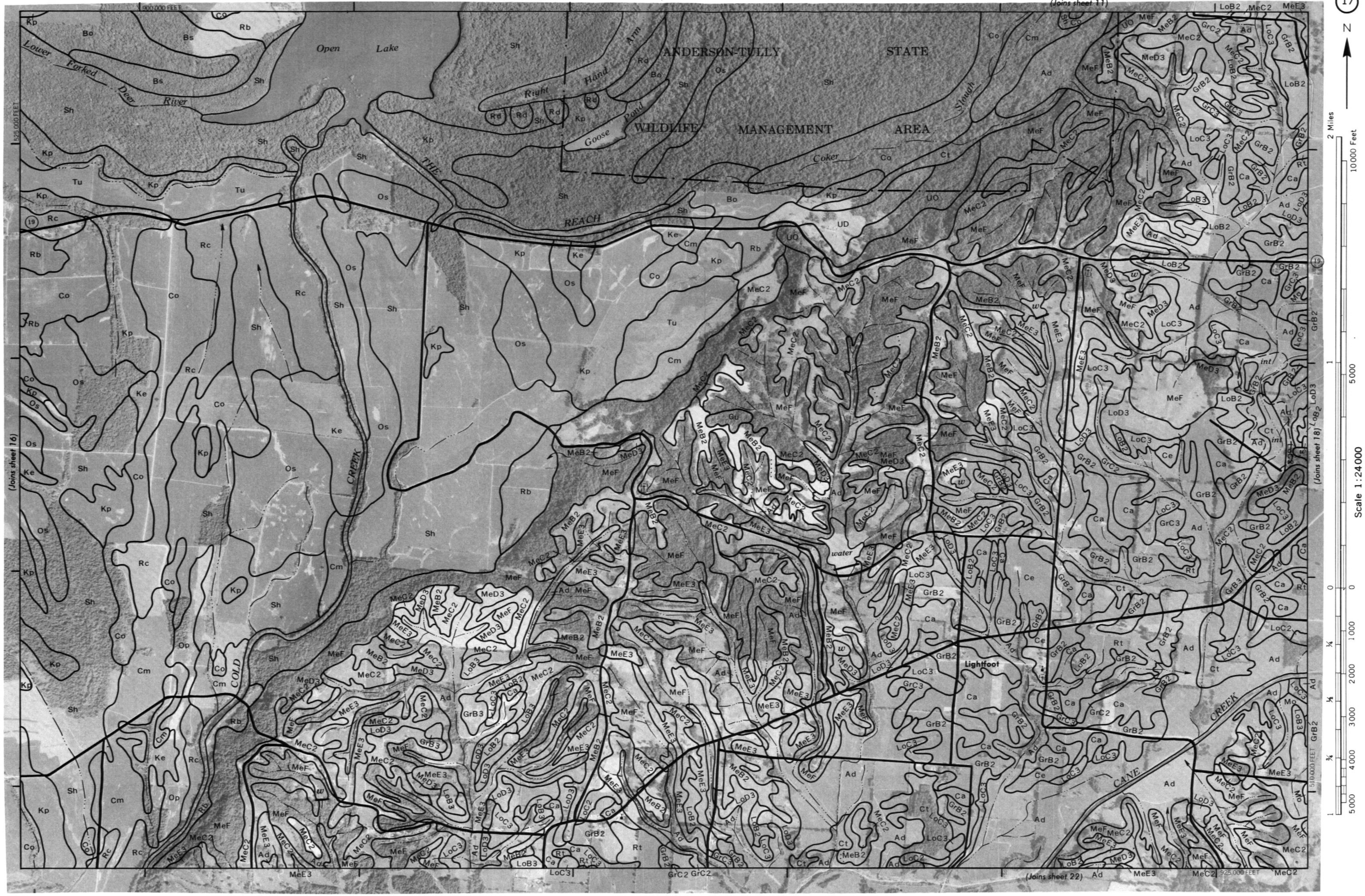

SOIL SURVEY OF LAUDERDALE COUNTY, TENNESSEE — SHEET NUMBER 18

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LAUDERDALE COUNTY, TENNESSEE NO. 18

LAUDERDALE COUNTY, TENNESSEE NO. 19

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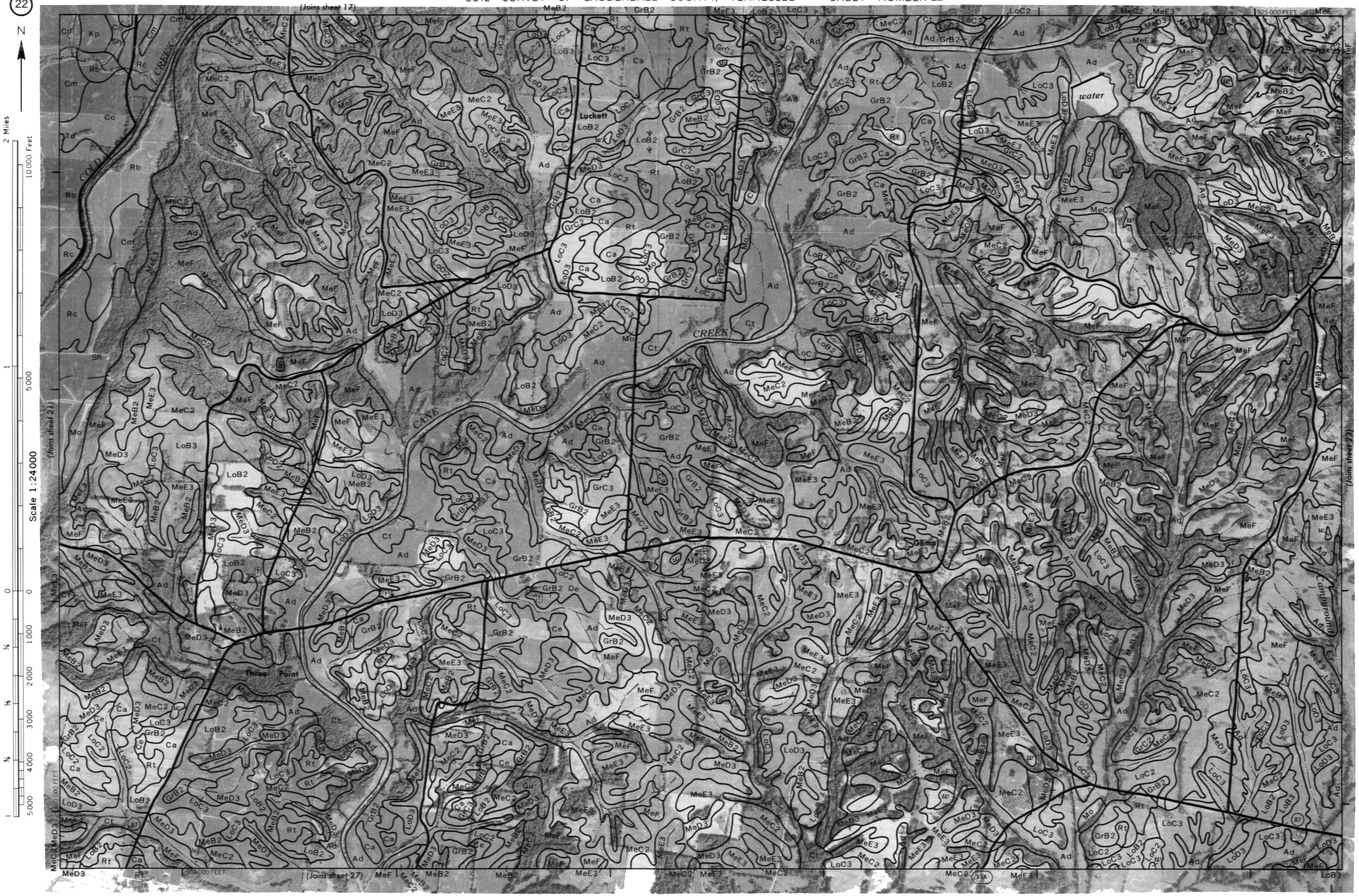

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LAUDERDALE COUNTY, TENNESSEE NO. 22

SOIL SURVEY OF LAUDERDALE COUNTY, TENNESSEE — SHEET NUMBER 23

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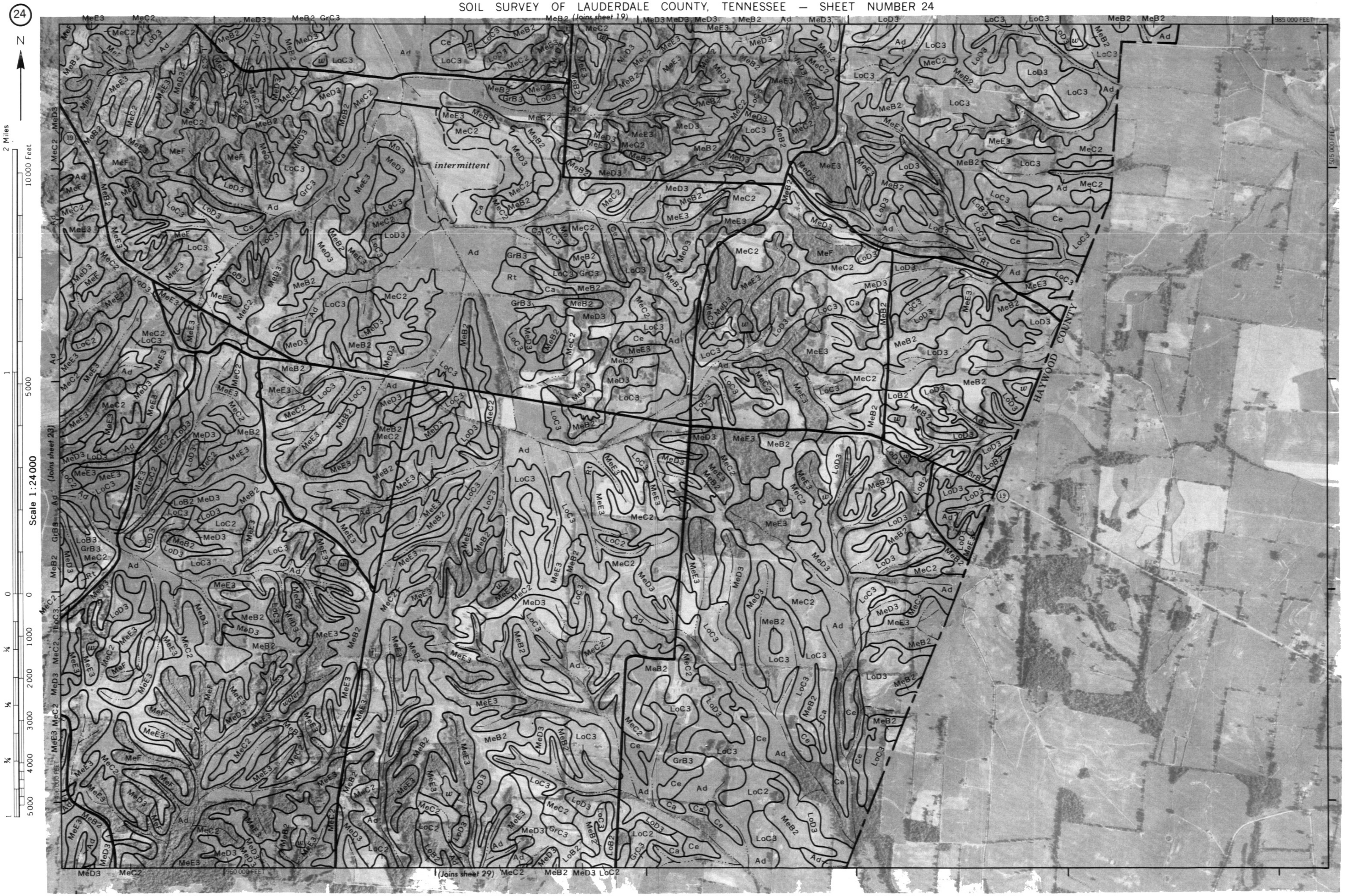

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LAUDERDALE COUNTY, TENNESSEE NO. 24

25

LAUDERDALE COUNTY, TENNESSEE NO. 25

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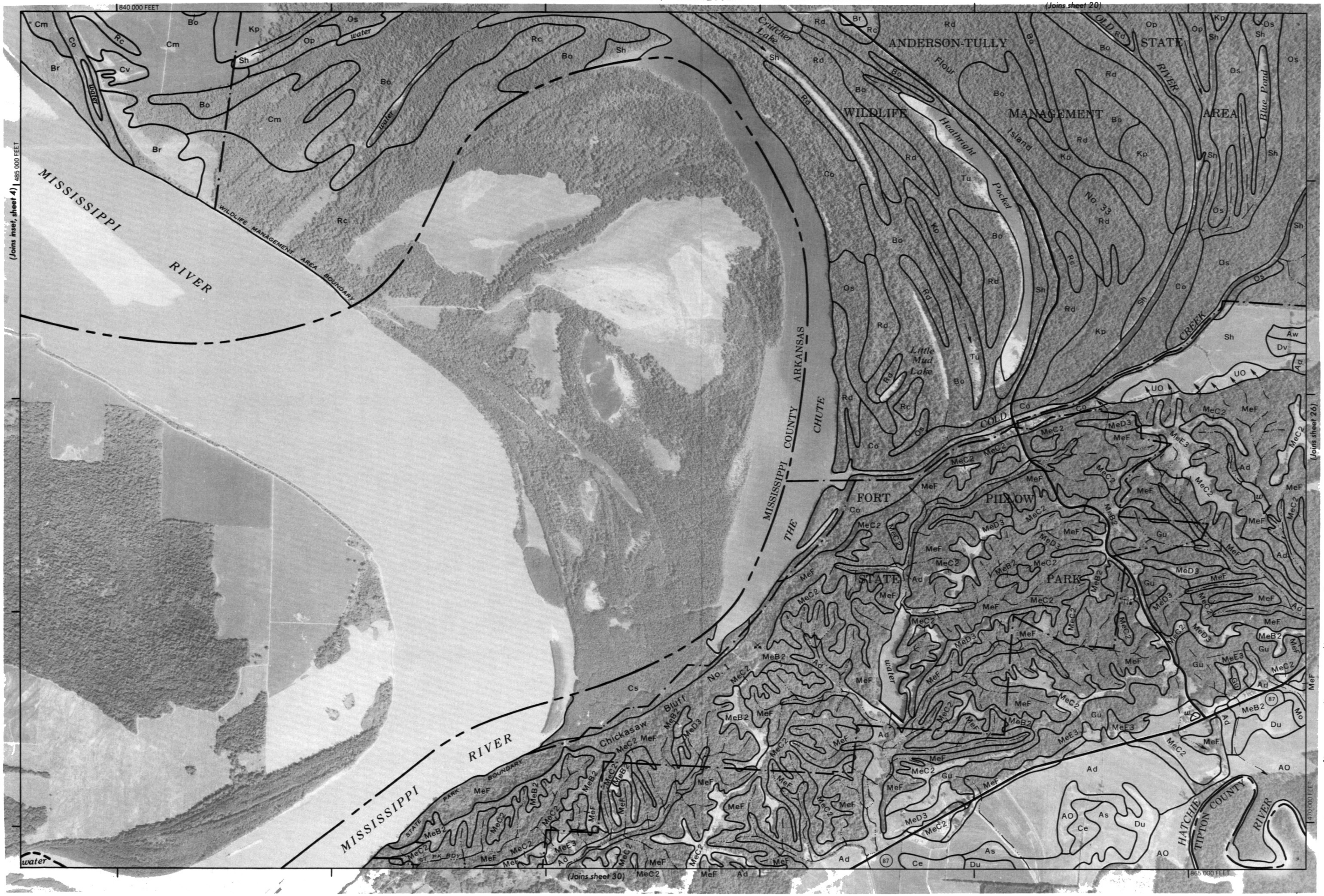
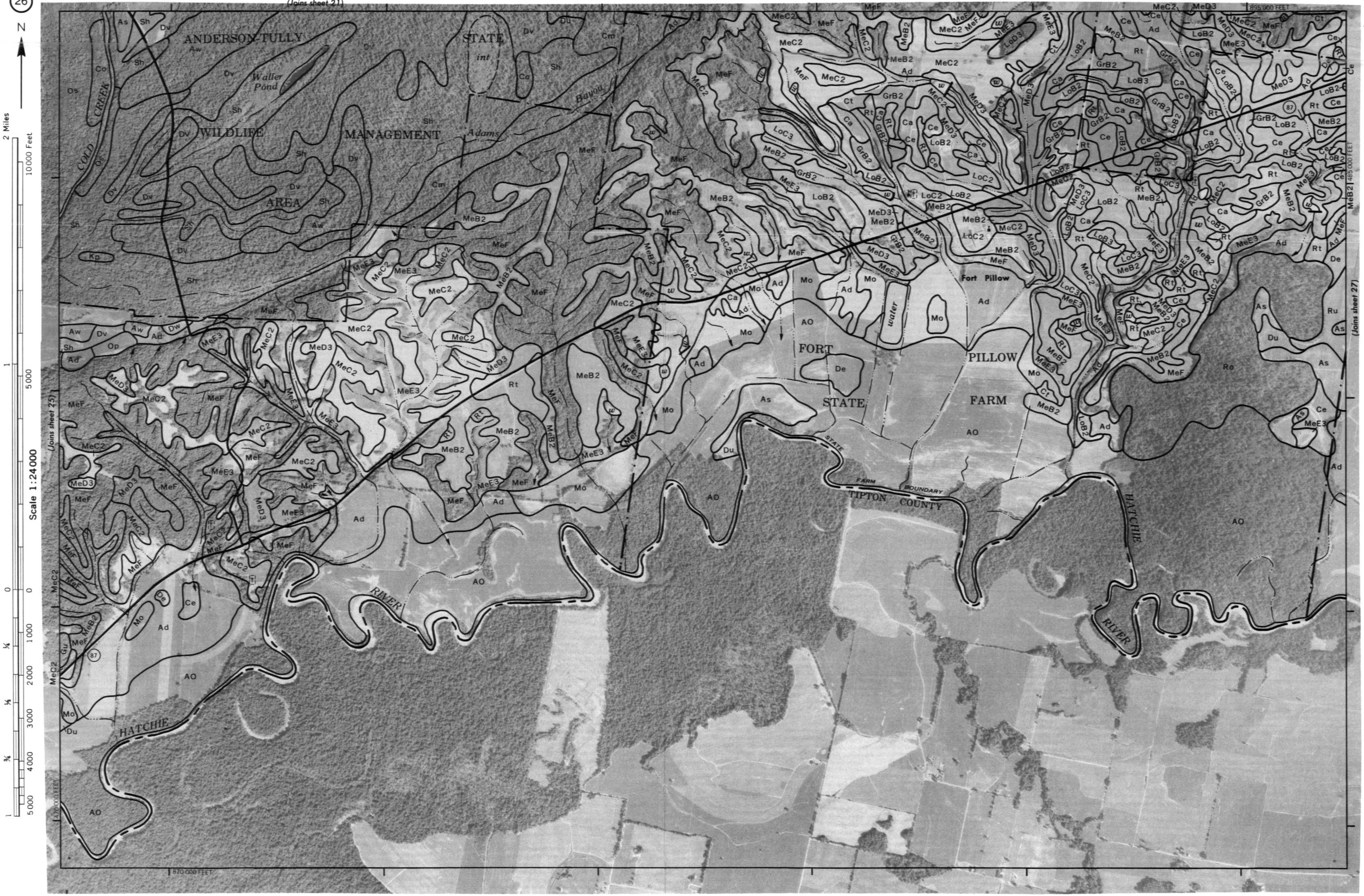


N

Scale 1:24000

0 ¼ ½ ¾ 1 2 Miles

5000 4000 3000 2000 1000 0 5000 10000 Feet



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SOIL SURVEY OF LAUDERDALE COUNTY, TENNESSEE — SHEET NUMBER 28

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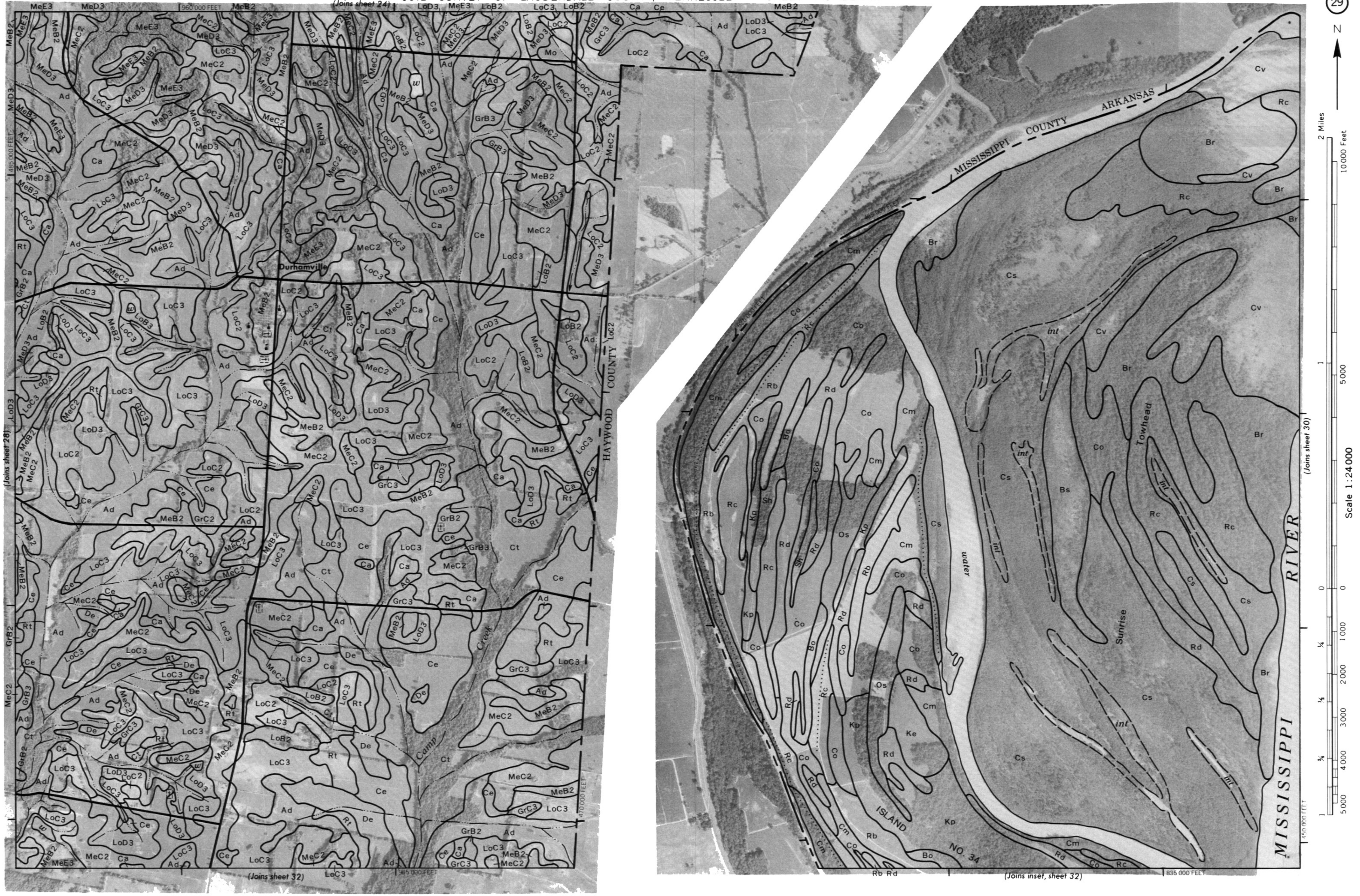
LAUDERDALE COUNTY, TENNESSEE NO. 28



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SOIL SURVEY OF LAUDERDALE COUNTY, TENNESSEE — SHEET NUMBER 30

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